

THE IRON AGE

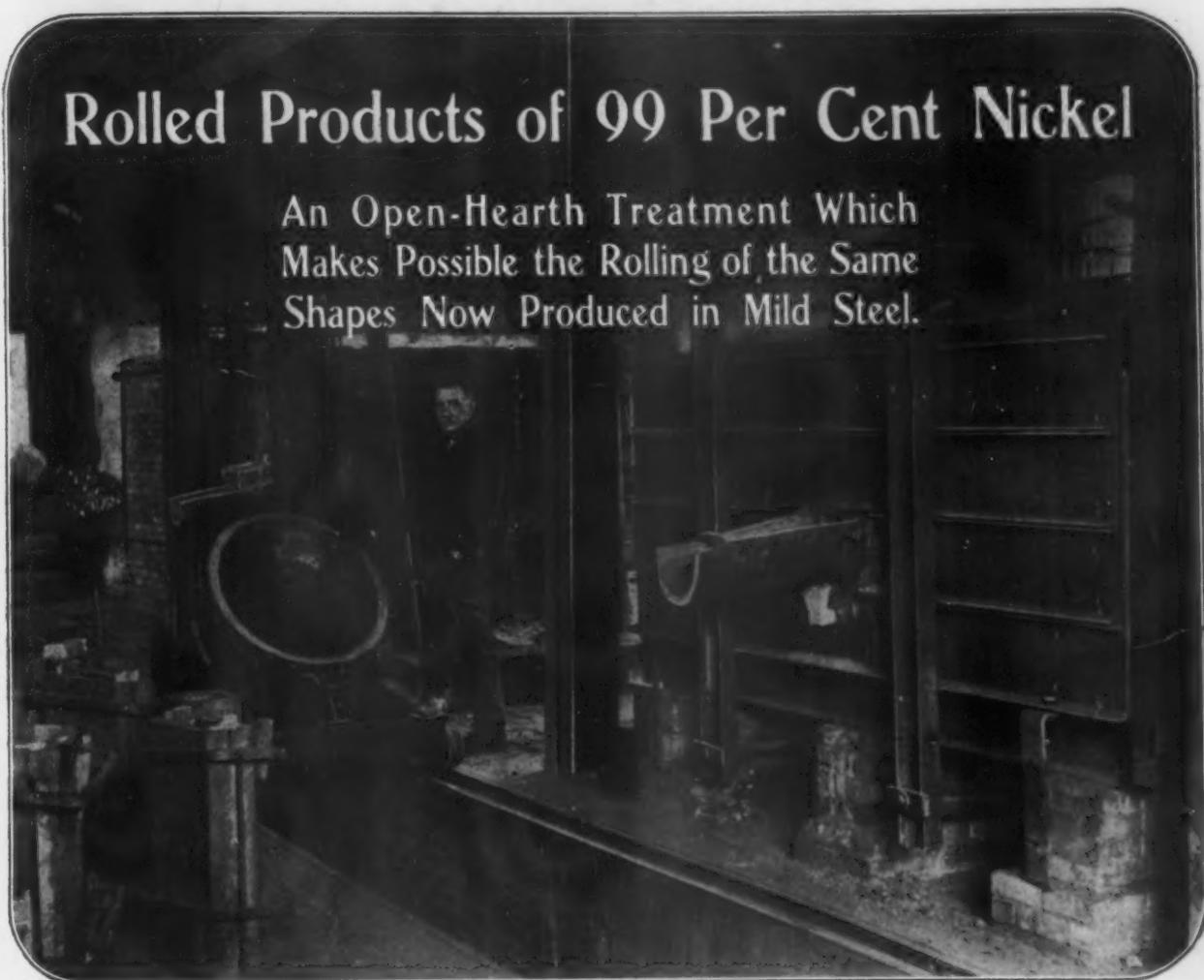
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Rolled Products of 99 Per Cent Nickel

An Open-Hearth Treatment Which
Makes Possible the Rolling of the Same
Shapes Now Produced in Mild Steel.



BY EDWIN F. CONE

THE rolling of nickel, 99 per cent pure, into the various shapes into which mild steel is rolled is an achievement of no small interest to the metal-working trade. Not only are nickel rolled products possible, but forgings have been attempted with success. In addition, fabrication has been accomplished with no more difficulty than in the case of mild steel. An interesting feature of this development is that the same apparatus is used for working the nickel as is used for the steel. It is possible to roll steel bars and then immediately to introduce pure nickel billets or ingots into the rolls.

The Nickel Alloys Co. is now rolling steel into bars and shapes, and is converting nickel, 99 per cent pure, into bars, plates, sheets and other forms on an extensive scale. Dr. Charles T. Hennig, who is responsible for this development in nickel products, has experimented for many years in making nickel malleable enough to be rolled or forged into various shapes. He considers that the objects he has sought are now fully attained, though the rolling of pure

nickel had long been considered impossible. The company's plant is located at Hyde, a small town in Clearfield County, Pa. It had previously been operated as a rolling mill. In 1916 Dr. Hennig obtained possession of it. After completely rehabilitating it and installing new equipment, he continued the rolling of steel while the development of the commercial production of pure nickel was under way.

Because of the non-corrodibility of pure nickel and its antiseptic properties, those interested predict its extensive use in many industries. It is especially suitable, as insuring easy sterilizing, in dairy machinery of all kinds; in dye house equipment, where acid and alkaline solutions are used; in gas and oil engines, where extremely high temperatures prevail; in marine installations where parts come in contact with salt water; in pickling and chemical works; in power plants and mining equipment. A large use for it as milk cans is expected. The high scrap value of the metal is an



Panorama of the Interior of the Nickel Alloys Co.'s Plant

important commercial factor. Unusual strength and durability, affording lighter weights for specified purposes, and the fact that non-corrodibility insures longer usefulness, are cited as offsetting the higher cost.

The new product has been given the trade name Niaco nickel, and the following properties are claimed:

It is 99 per cent pure, is malleable and is the purest nickel commercially produced.

It has great resistance to corrosion caused by acid fumes and acids, by alkalies, superheated steam, etc.

It oxidizes little at high temperatures.

It can be welded to iron, steel or to itself.

It is white in color, resembling silver.

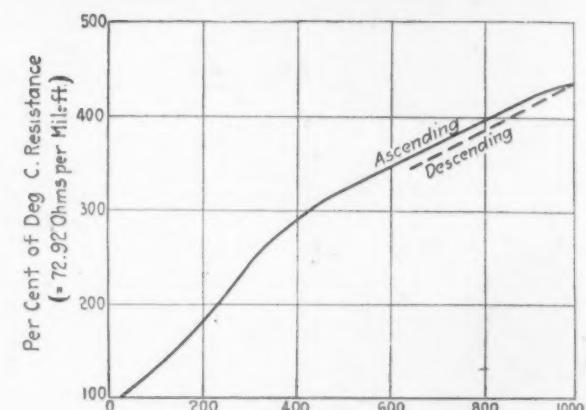
It has a specific gravity of 8.871 at 0 deg. C.

The average chemical composition is as follows:

		Per Cent	
Carbon	0.025	Silicon	0.155
Manganese	Trace	Iron	0.60
Phosphorus	0.015	Copper	0.12
Sulphur	0.025	Nickel (plus cobalt)	99.06

The melting point is 1485 deg. C. The coefficient of expansion from 25 deg. C. to 200 deg. C. is 0.0000125 and from 25 deg. C. to 300 deg. C. it is 0.0000135. Tests on the resistance of this metal to corrosion have shown the following results:

Reagent	Hours	Loss		Per Cent Loss Per Hour
		Per Cent	Hour	
Nitric acid, 1 per cent	462	1.227	0.002655	
Sulphuric acid, 1 per cent	462	0.526	0.001128	
Hydrochloric acid, 1 per cent	462	0.4282	0.000849	
Salt solution, 1 per cent	462	0.0508	0.000110	
Potassium hydrate, 1 per cent	462	0.05123	0.000111	
Water	462	0.00000	0.000000	
Potassium cyanide	473	0.423	0.000913	
Concentrated salt	462	0.1198	0.000259	



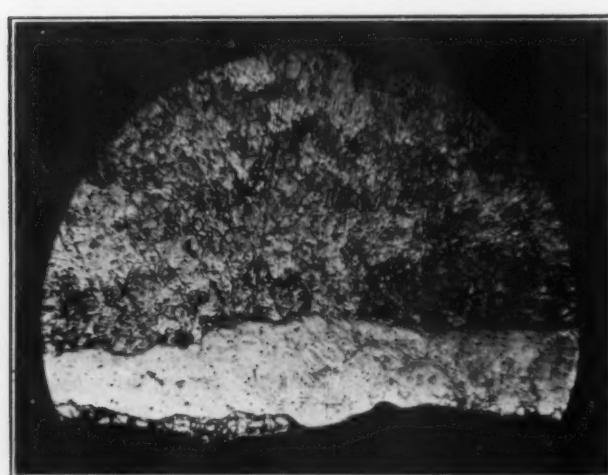
The Specific Resistance of Niaco Nickel Shown Graphically

The specific resistance of this pure nickel has also been determined as follows:

Ascending Temperature	Resistance in Ohms	Specific Resistance	Per Cent
25	0.065	72.92	100.00
200	0.123	138.00	190.21
400	0.191	214.40	294.00
700	0.239	269.00	367.00
1,000	0.284	319.00	437.00

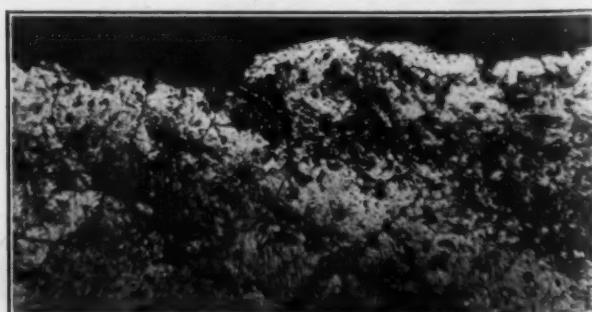
A diagram showing these values graphically is reproduced.

For the crude nickel obtained in the open market as raw material, Dr. Hennig has developed a special treatment preliminary to rolling it into the many shapes produced at the Hyde plant. Striking malleability, under all conditions of heat and cold, has been secured. The writer has seen a 4-in. section of a 1-in. round rolled bar of this metal flat-



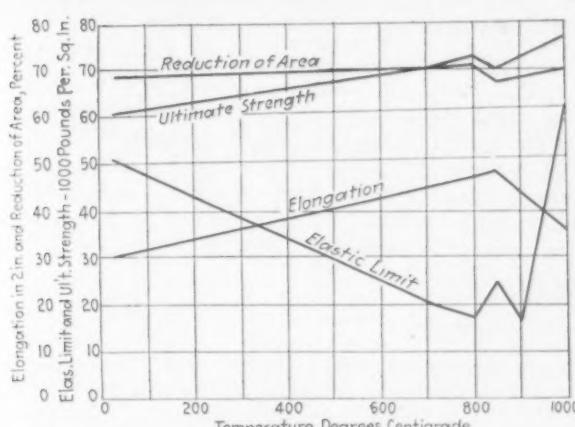
Photomicrograph, 150 Diameters (Left), of Boiler Tube Skelp Showing the Nickel Coated Weld. The nickel is 0.005 in. thick

Photomicrograph, 250 Diameters (Below), of a Lap-Welded Boiler Tube of Niaco Nickel, Revealing the Character of the Weld





Some of the Niaco nickel before final rolling is shown at the left



The Physical Properties of 99 Per Cent Nickel Graphically Reproduced

tened cold by up-setting under a 2500 lb. hammer until it was about $3\frac{1}{2}$ in. in diameter and $\frac{3}{8}$ in. thick, with no cracks or seams apparent. Also a 1-in. bar has been forged down hot to about $\frac{1}{2}$ in. and then flattened under the hammer until cold. This was then reheated and folded over on itself and again flattened under the hammer, until there were 128 folds in the resultant piece which showed only a few evidences of cracks or brittleness. It is Dr. Hennig's claim that this is not possible with ordinary commercial pure nickel.

The raw material is refined and specially treated in small 2- to 3-ton open-hearth furnaces, specially designed by Dr. Hennig. The illustration in-

roducing this article shows these furnaces. The hot metal is poured into ingot molds such as are used in making steel, at a temperature of approximately 3200 deg. Fahr. Various sizes of ingots are cast, the largest at present being one ton. These ingots are later broken down under hammers or in rolls after the usual preheating. To insure a perfect surface on the product, the ingots and sheet bars are always carefully machined. Sheets are rolled down in packs of 8 to 32 sheets to a thickness of 0.001 in. A large powder company is using this very thin metal in a special cartridge for smokeless powder.

Besides the properties given in the earlier part of this article, the following static properties are furnished as characteristic of Niaco nickel:

	Elastic limit Lb. per Sq. In.	Yield point Lb. per Sq. In.	Ultimate Strength, Tensile Strength, 2 in., of Area, Lb. per Sq. In.	Elongation in 2 in. Per Cent	Reduction of Area Per Cent
Heated to 700 deg. and hot rolled to 1 in. rods.....	41,000	56,000	84,000	31.0	70.2
Cold drawn 1 in. rods.....	54,000	100,000	101,000	10.9	65.4
Wire 0.500 in. dia..	62,300	.....	80,900	34.0	71.0
Wire 0.186 in. dia..	89,900	.....	105,200	11.5	59.2
Wire 0.062 in. dia..	114,500	.....	127,500	8.0	60.5
Wire 0.031 in. dia..	128,000	.....	140,000	6.0	42.4

A graphic representation of these values is reproduced. The high elastic ratio in some of these results is noteworthy. Other physical tests are furnished as follows:

Transverse test on a 1-in. diameter hot rolled bar:
 Elastic limit 27,500 lb. fiber stress
 Ultimate strength 84,300 lb. fiber stress
 Modulus of elasticity 16,500,000 lb. fiber stress

Double Cup Fractures of Physical Tests of Niaco Nickel



Torsion test of a 1-in. rod, hot rolled:

Elastic limit 12,250 lb. fiber stress
 Ultimate strength 80,800 lb. fiber stress
 Degree of twist per running inch 320 deg.
 Complete twist in 24 in., 21 revolutions.

The Brinell value of hot rolled material is given as 103 and of cold rolled up to 195. The metal can be bent back on itself without fracture, and it is stated that heat has no effect on the ultimate strength. When heated in air by a blow pipe at a temperature of 1900 deg. Fahr. for 3½ hr., no scale is formed, and the surface is only slightly tarnished by the heat. It can be heated almost to the melting point without the formation of scale.

The plant of the Nickel Alloys Co. covers 5½ acres and is divided into two portions, one of which is devoted to the production of Niaco products. The nickel mill contains a 22-in. one-stand three-high mill for sheets and rods; a 20-in. two-stand mill for sheets; a 12-in. three-stand, two-high mill for rods, and a 12-in. strip mill. There is also a wire mill containing 15 wire blocks and one bull block for cold drawn wire as well as a large piercing machine for tubes which will pierce a 2-in. hole in a 26-in. billet. The steel mill has an 18-in. mill, three-stand, three-high for 1½ to 4-in. rounds or squares and a 14-in. and 9-in. tandem mill for ¼-in. to 1½-in. rounds, squares or flats.

Besides Niaco nickel, the company produces nickel coated steel sheets or other products by rolling nickel sheets in conjunction with steel billets. By placing the nickel on one or both sides of the steel billet or slab the desired product is obtained

by welding. The character of the Niaco metal welds with steel is illustrated by photomicrographs. It is also possible to produce a highly polished nickel coated steel sheet.

Niaco tubes have been produced for service in locomotive boilers, and one railroad has obtained interesting results in such service. Photomicrographs are reproduced, illustrating the welding properties both in Niaco boiler tubes and when coating steel.

It has been found practically impossible to break sheets of moderate thickness by bending. A sheet 15 ft. x 52 in. x 3/16 in. thick is exhibited as the largest that has been made from pure nickel. In the passage through the rolls no scale is given off, and the working of the metal hot is a pleasant sight. Niaco nickel can be quickly annealed by heating to a yellow heat and plunging into cold water. It will then become as soft as copper. If plunged into liquid air it still retains its malleability, while copper and some other metals become so brittle that they will disintegrate or become granular.

George P. Bassett is president of the Nickel Alloys Co., Dr. C. T. Hennig is vice president, and T. J. Patton, secretary and treasurer. The directors are George P. Bassett, Dr. C. T. Hennig, W. J. Webster, president of the Atlas Powder Co.; Leland Lyon, treasurer of the same company, and Leonard Richards, president of Richards & Co., New York. The general offices are at 740-746 Henry W. Oliver Building, Pittsburgh.

GERMAN MACHINERY EXPORTS

Drop Coincident With Betterment of Exchange and Levying of Export Taxes

BERLIN, GERMANY, May 20.—A public meeting called by the Association of German Machine Builders, was held on May 19 in Berlin, to protest against the new export premium imposed upon exporters by a federal decree promulgated on April 17. Readers will probably remember that some months ago the German Government laid down certain rules and regulations covering the control of German foreign trade. The plan of charging an export premium "to be spent on social welfare work" was then foreshadowed and the exact meaning of this phrase has ever since formed the topic of the conversation among exporters. It was generally believed that the proposed levy was intended to finance the purchases of foodstuffs serving as extra rations for workers engaged on heavy work. This export premium had been fixed at 6 to 10 per cent of the invoice value and covers all orders for which an export license was granted after date of May 19. No premium will be charged on orders for which the license was granted prior to May 9 provided the goods in question are shipped before July 1.

There was a large attendance. The various parliamentary factions, chambers of commerce, foreign trade control boards as well as the different machine builders associations and sub-committees were represented by special delegates and the present policy of the government came in for a good deal of criticism. It was pointed out by leading industrialists that the levy on export—intended to be a special tax on the surplus profits realized by enormous depreciation of the German exchange—might have been justified six months ago, but to-day it spelled ruin to the German machine export industry.

Mention was made of the fact that while some months ago the industry did a large export business, a distinct decline was noticeable since the beginning of February. Compared with former months, foreign orders had shown a decline since March of approximately 20 per cent—a state of affairs held principally due to the continuous improvement in the German ex-

change during the latter months and aggravated by the ever fresh wage claims and rising cost for raw materials. Such indeed is the increase in cost that prices for German machinery had already reached, if not surpassed, the world's markets level, and the speakers were unanimous in their declaring that the industry was unable to stand the strain on their financial resources any longer. Other prominent speakers were even more outspoken in demands, urging an immediate repeal of the law lest the export trade of the German machine industry—and incidentally the latter—should collapse.

I understand there is a possibility of a modification of the present outline of the law seeing that the government is apparently not unwilling to accede to the request of the textile industry to revise the present form of the law. I was also informed that the new levy will probably take the shape of a sliding scale of an elastic nature so as to be adaptable to the constantly changing conditions obtaining in the reconstruction of the German economic system, though it remains to be seen whether the government will act upon the suggestion put forward on behalf of the Association of the German Metal Industries, viz., to fix the dollar exchange as a standard for the proposed sliding scale.

C. A. H.

At the recent annual meeting of the Industrial Association of Cleveland, officers for the ensuing year were elected as follows: President, A. C. Brown, president Brown Hoisting Machinery Co.; vice-president, R. J. Goldie, works manager Columbia Axle Co.; treasurer, H. B. Bole, vice-president Hydraulic Steel Co.; executive committee, Sheldon Gary, president the Browning Co.; W. C. Sly, president and general manager of W. W. Sly Mfg. Co.; Willard Fuller, works manager Upson Nut Co., and Charles Woodward, director of industrial relations Hydraulic Steel Co.

Grinding wheels, their manufacture, uses in industry and factors affecting their selection were discussed by Wallace T. Montague, assistant sales manager Norton Co., Worcester, Mass., before a recent meeting of the Engineers' Society of Western Pennsylvania, Union Arcade Building, Pittsburgh.

Microscope and Steel Heat Treatment

Structure at High Temperatures—Detecting Causes of Failures—Finding Unusual Elements—Application to High Speed Steel

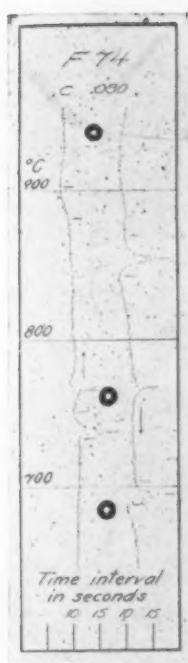


Fig. 1.—Inverse-Rate Thermal Curves of 0.08 Per Cent Carbon Steel. The horizontal lines indicate the temperatures 700, 800, and 900 deg. C. The specimens shown in Figs. 2, 3, and 4 were heated at the approximate temperatures shown by the circles.

the great usefulness of the microscope in a field not specifically treated by Professor Sauveur, or the rôle played by the microscope, not only in elucidating the intricate behavior and complicated transformations in steel, but also as a shop tool which has become indispensable to practically all steel manufacturing operations and especially in the control of high-class products through the various inspection stages. I will mention briefly the present orientation of some typical metallographic problems in which we are interested at the Bureau of Standards.

Steel is usually examined when cold, but a knowledge of the structure which exists at elevated tempera-

A VALUABLE and interesting discussion of Dr. Albert Sauveur's paper, "The Microscope and the Heat Treatment of Steel," presented at the spring meeting of the American Iron and Steel Institute in New York, May 28, and abstracted in THE IRON AGE, June 3, was offered by George K. Burgess, United States Bureau of Standards, Washington. The major portion of this discussion follows:

A great deal of investigation is in progress on the improvement and scope of the various physical methods of testing metals, such as hardness, magnetic properties, thermal analysis, X-ray examination, alternating stress and impact tests, as well as their correlation and interpretation in terms of the history of the metal as related to its chemical composition, manufacture, working hot or cold, and heat treatment, and finally as visualized by means of the microscope. A development of special significance and promise is the increase in the adaptation of testing methods to steel at elevated temperatures.

Professor Sauveur has given an admirable summary of the present state of our knowledge concerning the inter-relations of the indications of the microscope and the constituents of steel as dependent upon its heat treatment. Some emphasis might also be placed upon

tures is often of considerable value; in particular is this true for those alloys which show certain critical transformations as does steel. A convenient method for studying the changes which the structure undergoes upon heating is that which has been designated as "heat etching." The specimen which has been polished for microscopic examination is heated in vacuo for a period of 30 min. or more at the desired temperature and then allowed to cool in the evacuated furnace. The surface remains bright and free from oxide, but on account of a slight volatilization of the surface metal which occurs, as well as the differential expansion of the various constituents, a record of the structure which exists at the high temperature remains. No further etching of the specimen is necessary. Often two or more patterns superimposed one upon the other, each corresponding to the kind of structure within a certain temperature interval, are to be found.

Fig. 1 shows the thermal curves of a low carbon steel (0.08 per cent) giving the three transformations, A_1 , A_2 , A_3 . Specimens were heated for 30 min. at the temperatures indicated by the black circle in order to illustrate the structure which exists just below the A_1 transformation, just above A_1 and above A_3 . Although the specimens used were not exactly the same as the one for the thermal curves, they may be used to illustrate the principle.

The structure of low carbon steel (0.08 per cent) remains unchanged up to the temperature of the A_1 transformation, as is shown in Fig. 2. By heating a similar specimen for 30 min. in vacuo just above the A_1 transformation, the change shown in Fig. 3a results. The two constituents making up the pearlite verge into a uniform solid solution, i.e., the carbide no longer exists as discrete particles, but is dissolved in some of the surrounding ferrite. The extent of the fields of the solid solution which replaces the pearlite are to be seen better in Fig. 3b, which shows the structure at a higher magnification. The boundaries of these fields of the solid solution are gradually extended upon continued heating or by raising the temperature. It is very evident that quenching a specimen of steel from just above the A_1 transformation will produce a much more pronounced change in physical properties than will be produced by quenching the same specimen from below the A_1 transformation, i.e., before any structural change had occurred.

A specimen, heat-etched by heating in vacuo above the A_3 transformation, is shown in Fig. 4a. A still more pronounced change has occurred. All trace of the pre-existing pearlite has disappeared (specimen, 0.05 per cent carbon) as the solid solution becomes

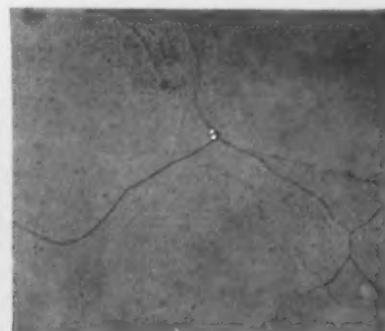
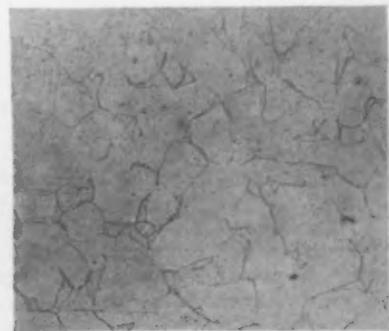
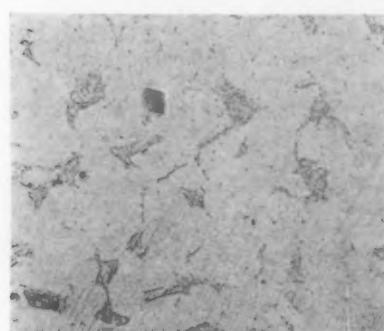


Fig. 2.—Microstructure of Low-Carbon Steel Just Below the A_1 transformation. The specimen was heated for 30 min. in vacuo just below the A_1 transformation temperature. The effect of the heat etching has been polished off and the specimen etched with 2 per cent alcoholic nitric acid. Magnification, 100 dia.

Fig. 3.—Microstructure of Low-Carbon Steel Just Above the A_1 Transformation. (a) Center—The polished specimen was heated for 30 min. in vacuo at 700 deg. C., or above A_1 transformation temperature. The surface has been heat-etched. Magnification, 100 dia. (b) Right—Same as a magnification of 500 dia. The pearlite has formed a solid solution which has merged with the surrounding ferrite to some extent.

uniform throughout the specimen. A pronounced change in crystalline characteristics occurs as the specimen is heated above the A_s transformation, as is shown by the dark heavy outlines in Fig. 4a. The steel when

nickel content, as was confirmed by chemical analysis, and is due to faulty practice in the melting of the steel. The nickel has not had time to become thoroughly and uniformly disseminated throughout the ingot before

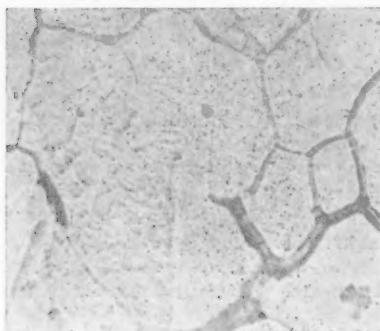
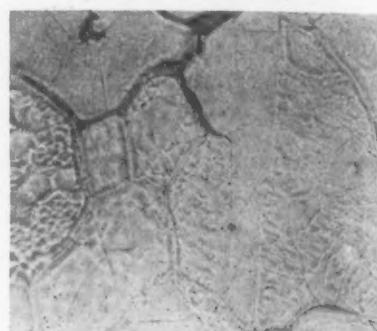


Fig. 4.—Microstructure of Steel Above the A_s Transformation Temperature. A polished specimen of very low-carbon steel (approximately 0.05 per cent) was heated in vacuo for 30 min. at 950 deg. C. (a) (Left) Two crystalline systems are shown, the one with the wide dark boundaries represents the gamma state, stable above A_s . Many of these crystals are twinned. Superimposed upon the gamma structure is a fine network which corresponds to the alpha structure, stable below A_s . (b) (Right) Same as a at a slightly different focus. Magnification, in both cases, 500 dia. The specimen was "heat-etched."



in this state, the gamma or austenitic condition, often shows a twinned arrangement of the crystals as shown by the large central crystal. Superimposed upon the pronounced network of Fig. 4a may be seen a fine, rather inconspicuous one corresponding to a condition in which the crystals were smaller and differently arranged. This is better shown in Fig. 4b, which shows the same spot on this specimen at a slightly different focus. This corresponds to the alpha state of the steel. It is not surprising, in view of the pronounced structural change which occurs at the temperature of the A_s transformation, that this temperature is of great importance in the heat treatment of steels.

Microscopic Post Mortems

An interesting example of the application of the microscope in detecting conditions which are often erroneously attributed to faulty heat treatment is

solidification occurred. Such a condition could not be remedied by any heat treatment short of remelting.

High-Speed Tool Steel

One of the most interesting classes of steel to be studied in the relation of heat treatment to metallurgical constituents and performance is high-speed tool steel. In order to develop to the full extent the characteristic properties of such steels certain precautions must always be observed in the heat treatment, one of the most important of these being the use of an excessively high temperature for hardening such as would ruin simple steels. The use of the microscope will make clear the necessity for this high-temperature treatment, as shown in the photomicrographs. These have been selected with the aim of also showing the underlying reasons which give this steel many of its characteristic properties. Among these

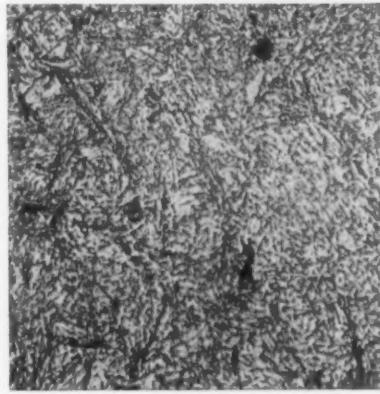
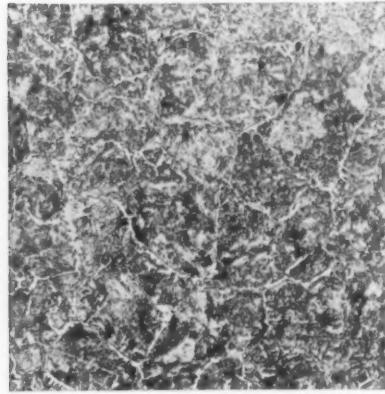


Fig. 5.—Detection of Faulty Treatment by the Microscope. (a) (Center) Polished and deeply etched longitudinal section of a "small arms" part. The steel contains approximately 3.50 per cent nickel. The center is very ready attacked by the acid used for etching. Magnification, one dia. (b) (Left) Microstructure of the portion of the specimen outside the central streak. This was taken before the specimen was deeply etched. The structure is that usually obtained for this steel when in the soft state. Magnification, 100 dia. Etching 2 per cent alcoholic solution of nitric acid. (c) (Right) Microstructure of the central streak of a. The material here is martensitic due to the high-nickel content of this portion. Magnification, 500 dia. Etching, as in (b)

given in Fig. 5a, which shows a section through a portion of a steel rifle part. The material which appears to be very unsuitable for use is of nickel steel (approximate nickel content, 3.5 per cent), and has been sectioned longitudinally through the center, polished and etched deeply with concentrated hydrochloric acid. Previously to the deep etching of the specimen, the microstructure of the body of the piece, as well as the central portion was examined. This is shown in Figs. 5b and 5c. The greater portion shows the usual structure of this type of steel, pearlite grains enclosed in a ferrite envelope. A striking contrast to this will be noted that the central portion is martensitic, and it is not surprising that unsurmountable difficulties were encountered in attempting to drill these specimens. That the material has received no hardening treatment is evident from the structure of the greater portion of the specimen. The martensitic condition in the center is to be attributed to an abnormally high

may be mentioned "secondary hardness," that is, the increase in hardness produced by tempering, and "red hardness," or the ability to retain its hardness at a red heat. The steel used was of the following composition: Carbon, 0.77; tungsten, 17.8; chromium, 3.5, and vanadium, 0.74 per cent.

The series of six photomicrographs in Figs. 6a to 6f show the microstructure resulting by quenching in oil from 1290 deg. C. and tempering at temperatures ranging from 200 to 800 deg. C. The material, as quenched, is largely in the austenitic state, and contains some particles of free carbides. Upon tempering the austenitic matrix shows the characteristic pattern of martensite. This is only faintly shown by the specimen tempered at 200 deg. C., but is very pronounced in those tempered at 400 and 600 deg. C., and still shows faintly in the specimen tempered at 700 deg. C., although the specimen for the most part consists of troostite. In specimens tempered at 800 deg. C., however, all trace

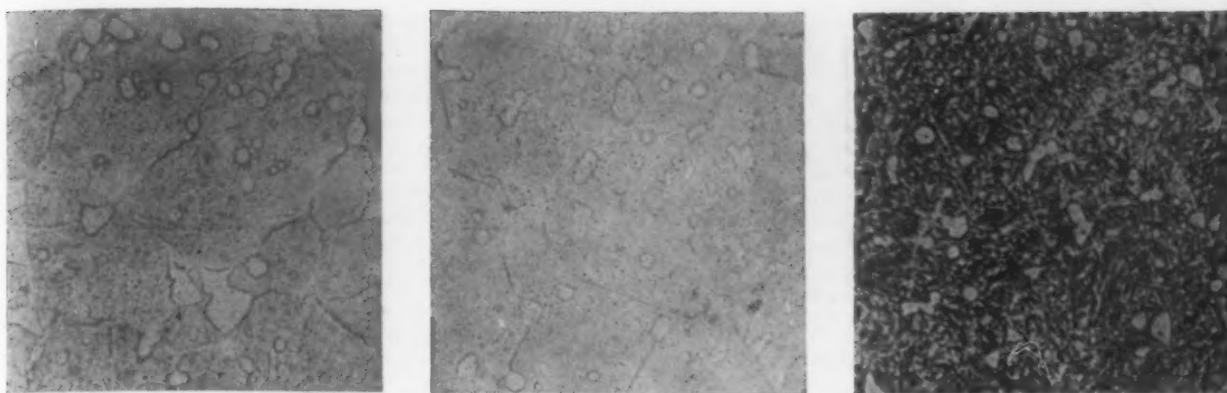
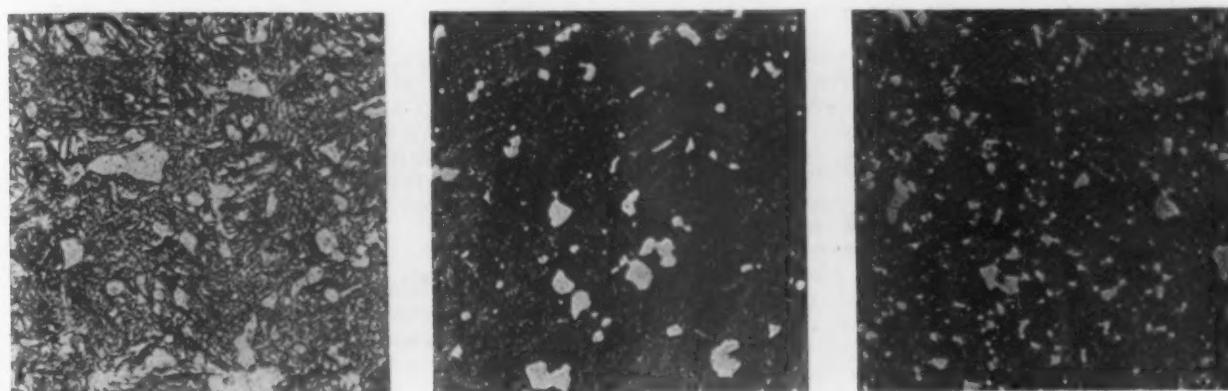


Fig. 6.—Relation of Microstructure of High-Speed Tool Steel to Its Heat Treatment. Steel of the composition, carbon 0.77; tungsten 17.8; chromium 3.5, and vanadium 0.74 per cent was given the treatment as given below: (a) (upper left) Quenched in oil from 1290 deg. C. The material is largely austenitic in structure. (b) (Upper center) specimen a tempered at 200 deg. C. A very pronounced martenitic pattern has resulted. (c) (Upper right) specimen a tempered at 400 deg. C. The structure is still martenitic and very similar to that shown in C. (d) (Lower left) specimen a tempered at 600 deg. C. The structure is largely troostitic though traces of the martenitic pattern still persist. (e) (Lower center) specimen a tempered at 700 deg. C. The structure is approaching the sorbitic state. (f) (Lower right) specimen a tempered at 800 deg. C. The structure is approaching the sorbitic state.

Magnification in all cases, 500 deg.; etching, 2 per cent alcoholic solution of nitric acid.



is lost and the material is approaching the sorbitic state. Naturally it is to be expected that the material will show pronounced changes in its physical properties corresponding to these structural stages accompanying the tempering.

Identification of Unusual Elements in Steel

Another problem to which we have given considerable attention, in which the microscope plays a most important rôle, is the identification of unusual elements in steel and their effect on physical properties as influenced by heat treatments. In steels designed for light armor containing zirconium, uranium, boron, or titanium, and other rare elements, examination of their microstructure showed that they could conveniently be divided into two classes: those in which the added element acts as a "scavenger," and those in which the added element acts as a true alloying constituent.

As studied by S. Epstein the microstructure of the steels containing zirconium and titanium are very similar, Figs. 7a and 7b. In both are found small square inclusions, yellow for zirconium and orange pink for titanium, not clearly visible at magnifications lower

than 500 diameters. The presence of these elements does not otherwise appear to affect the microstructure. These elements also come together to form tiny segregates of the square inclusions throughout the ingot. These segregates when rolled out appear as thin red-like streaks. Very few of the square inclusions are found outside of the segregates and streaks.

Unlike zirconium and titanium, uranium appears to enter into solution in the steel, that is, it is a true alloying addition. In the normalized specimens a distinct martenitic and troostitic pattern is present, which is undoubtedly due to the presence of the uranium in solid solution, as otherwise the structure would consist of granular pearlite and ferrite (Fig. 8c).

Boron acts still differently, and appears to combine with the carbon, forming a complex carbide which exists in the form of a low melting eutectic. In rolling ingots containing boron up to 0.6 per cent, it was found that if they were heated to the temperatures ordinarily used for rolling steels it was impossible to work them. The ingots broke in the rolls, while one even fell apart as it was being removed from the furnace. At a lower temperature, however, 850 deg. C., they were

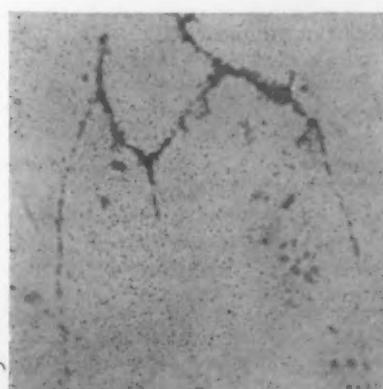


Fig. 7.—The Microstructure of Steels Containing Zirconium and Titanium. (a) (Left) Thread-like segregate of square inclusions in a $\frac{1}{2}$ -in. plate, as rolled. Some of the square inclusions are yellow while others are orange pink. Not etched; magnification, 500 dia. Composition: C., 0.43; Si., 1.09; Mn., 0.87; Ni., 2.0; Ti., 0.14 and Zr., 0.13 per cent.

(b) (Right) The microstructure of cast steel containing zirconium. The steel contains 0.11 per cent zirconium and 0.12 per cent titanium, the small square inclusions are bright yellow in color. Etching 2 per cent nitric acid in alcohol; magnification, 500 dia. Composition: C., 0.46; Si., 0.87; Mn., 0.78; Ni., none; Ti., 0.02 and Zr., 0.11 per cent.



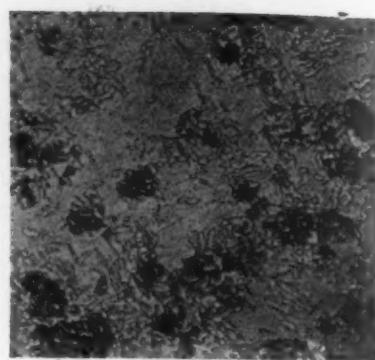
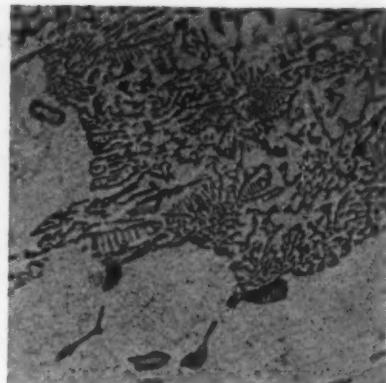


Fig. 8.—The Microstructure of Steels Containing Boron and of Steel Containing Uranium. (a) (Left) Circular and elongated particles of boron compound in quenched and tempered steel containing boron. These particles remain pure white under the action of 2 per cent nitric acid but etch dark in sodium picrate. The steel contains 0.10 per cent boron. Etching, 2 per cent nitric acid in alcohol; magnification, 500 dia. Chemical Composition: C., 0.69; Si., 0.36; Mn., 0.50; Ni., 2.90; B., 0.10 per cent. (b) (Center) Eutectic in steel ingot containing boron. This eutectic is pink in color in the unetched state. In sodium picrate it etches dark. The steel contains 0.49 per cent boron. Etching, hot alkaline sodium picrate. Magnification, 500 dia. Chemical analysis, C., 0.16; Si., 1.32; Mn., 0.64; Ni., 2.82; B., 0.49 per cent. (c) (Right) Martensite and troostite in normalized specimen of steel containing uranium. The steel contains 0.52 per cent uranium. The specimen was heated to 800 deg. C. and cooled in air. Etching, 2 per cent nitric acid in alcohol. Magnification, 500 dia. Chemical analysis, C., 0.63; Si., 1.20; Mn., 0.84; Ni., 3.01; M., 0.52 per cent.

worked successfully. Microscopic examination indicated that the eutectic, probably that of an iron-boron-carbide compound with iron (Figs. 8a, 8b), is fusible at ordinary rolling temperatures.

Behavior of Etching Reagents

Among other lines along which important advances in the microscopic study of metals may be expected, we may mention the systematic study of etching reagents. Most of the work in this field has been carried out hitherto empirically; but a beginning has been made at the Bureau of Standards to develop the subject rationally and an investigation of etching reagents suitable for copper has just been completed by Mr. Rawdon and Miss Lorentz, in which it is shown that as might have been anticipated there are certain general laws underlying the behavior of all etching reagents; that in the case of copper, for example, it is necessary to have simultaneously an oxidizing action and a dissolving action. Thus, many solutions which have but a very slight etching action upon copper may be made to etch readily by passing oxygen through them, but solutions which have no solvent action upon copper cannot be made to etch the metal by the addition of oxygen.

England Needs American Pig Iron

William W. Hearne, of the Matthew Addy Co., pig iron, Real Estate Trust Building, Philadelphia, who has returned from a business trip to Europe, found considerable industrial activity in all of the countries he visited, particularly Great Britain, Holland and Belgium. The steel industry of Great Britain, he found, is most seriously troubled by a shortage of raw materials. Some of the largest and most modern blast furnaces are out of blast because of inability to obtain sufficient ore shipments from Spain. Consequently there is a shortage of pig iron and raw steel, which is reflected in the increasing demand of late for these products in the United States. One of Mr. Hearne's reasons for believing that prices of pig iron in the United States will remain high and firm for some time to come is that any decline in prices here would immediately result in an increased demand from England. Bessemer and basic iron is badly needed there, and a reduction of a few dollars in the quoted prices in the United States would permit the exportation of large tonnages at prices c.i.f. English ports equivalent to, if not less than, the market prices prevailing for British iron of corresponding grades.

Mr. Hearne found that conditions abroad are in many respects a duplicate of those existing in this country. Transportation troubles, shortages of raw materials, high prices and attendant ills prevailing in the United States have their counterpart in the industrial countries of Europe. Notwithstanding these difficulties, Mr. Hearne found that British industries in particular are extremely busy. There are no outward

evidences, he said, that anything is wrong with England financially; in fact, to the ordinary observer the people of that country seem unusually prosperous. Contrary to some statements which have been published, England is not apparently suffering from any shortage of food, except sugar, and in this commodity conditions are no worse there than here.

British Iron and Steel Output in May

LONDON, ENGLAND, June 14 (*By Cable*).

The production of pig iron in Great Britain in May was 739,000 gross tons and that of steel was 846,000 tons, as compared with 671,000 of pig iron and 794,000 of steel in April. The pig iron output in January, February and March was 665,000 tons, 645,000 tons and 699,000 tons respectively, with the monthly average for 1919 at 617,000 tons. The steel output was 754,000 tons in January, 798,000 tons in February and 840,000 tons in March, with the 1919 average at 658,000 tons per month.

Decreased Building in Detroit

DETROIT, June 14.—Building construction in Detroit received a severe setback in May of this year. The estimated cost of buildings for which permits were issued was not only less than that of May, 1919, but it was less than half the amount credited to April of this year. The falling off was greatest in factory construction, but it was also great in dwelling construction. Building permits for May, 1919, were 2514 in number, with an estimated cost of \$6,712,890, while for May, 1920, they were 2296 in number, with an estimated cost of \$5,739,815.

The Penn Seaboard Steel Corporation's new blooming mill at Newcastle, Del., is now in operation. This mill is a two-high, 34-in. reversing mill, directly connected to a 6000-hp. Westinghouse motor, and equipped with motor-driven screw down and manipulator. Three additional gas producers and two new soaking pits have also been installed. Shears are of the guillotine type, motor driven, capable of shearing 8 in. x 8 in. This mill has a capacity of 20,000 tons of billets, blooms and slabs per month.

Arthur G. McKee & Co., engineers and contractors, Cleveland, have been awarded a contract by the Bengal Iron & Steel Co. covering the furnishing of a 5 unit Kling-Weidlein patented dry gas cleaner for its blast furnace plant at Kulti, Bengal, India. All materials and equipment for this plant are being manufactured and shipped from America. The McKee company is also designing, furnishing materials and supervising the erection of the Nos. 1 and 2 blast furnaces of the Indian Iron & Steel Co. at Asansol, India.

CHANGING CONDITIONS

Railroad Service at Youngstown Much Improved—Interesting Market Phases

YOUNGSTOWN, OHIO, June 15.—That the third quarter will find iron and steel production more nearly equal to demand and that there may be a shifting from a seller's to a buyer's market before the end of the year is the belief in influential industrial and financial circles. This belief is accentuated by cancellations, especially from the automobile industry and from large contractors and is strengthened by the financial stringency. The president of the leading banking institution in the district, who is also a director of the largest steel corporation in the Valley, states that while the steel producers are now in good financial condition, it may be necessary for them to borrow later in the year. Accordingly the banks are making preparations to meet any demands upon them that may be made in this respect. Another unmistakable index of a change is the labor market. Men who a year ago were protesting against capitalism when they were drawing \$350 and \$400 a month, are now willing to accept much less. This fact indicates one of the important undercurrents. Workers are not nearly so independent as they were 12 months ago. Loss of employment on account of the steel, coal and railroad strikes in face of unprecedented living costs has made them anxious for a period of prolonged work. Furthermore, the curtailment of district plants, headed by the Youngstown Sheet & Tube Co., for an indefinite period, has produced, not a surplus of workers, but a diminished demand for help from all manufacturing concerns.

It is also significant that labor is more efficient than it was even six months ago. One leading maker states that production, at a largely reduced rate of operation, is on the same basis as when the plant was running in full a year ago.

Market Is Still Firm

The market continues firm, however, with demand still far in excess of production and far ahead of shipments. Railroads continue to attack the mass of unshipped tonnage and are making small gains. For instance, at end of the week, 7000 cars of material were still piled in yards and warehouses, compared with 8000 the week before. The Carnegie Steel Co. has made appreciable gains in shipments and about 65 per cent of its output is moving from the yards.

Operating schedules continue to accelerate, indicating that the problems with respect to fuel are being

overcome. Industries are well supplied with day-to-day coal rations on their present operating basis, with some surplus supplies. Shortage of box cars is still hampering deliveries and an appreciable improvement in this respect seems delayed for an indefinite period. The car service commission of the American Railway Association has ordered box cars into the grain country and they are going there for the most part. The practice of making up trainloads of empties at the Eastern terminals and shipping them westward is being followed by the carriers, it is declared, with the result that the shortage for industrial uses is increased. Inadequacy of motive equipment is also a deterring factor.

Increased Production

Twenty of the 25 blast furnaces in the Mahoning Valley are now pouring, the last to become active being No. 2 in the Hubbard group of the Youngstown Sheet & Tube Co. All six stacks of this company are now active and its production is more nearly normal than at any time since the railroad strike started. Delivery difficulties are retarding production, however, the company operating its units according to an announced reduced schedule. Five of its by-product coke oven units are in commission, one additional unit being added during the week.

Open hearth operations are unchanged, with 51 active furnaces out of 66 in the Valley.

The Republic Iron & Steel Co. made substantial additions to its operating units this week, adding the 14-in. and 16-in. mills at Lansingville and the 8-in. continuous mill at the Brown-Bonnell works.

With renewed activity in steel plants, the iron and steel scrap markets have become more active, though confronted by unusual traffic obstacles. Heavy melting is quoted at \$25 to \$25.50 by the leading dealer; No. 1 busheling \$23.50, Chicago, and cast iron borings at \$18.50 gross, Youngstown. Prices, on the whole, are responding to the increased demand.

Tinplate production in the two Valleys received an impetus last week when the American Sheet & Tin Plate Co. started 60 mills at New Castle.

The report of plant schedules for transmission to the Interstate Commerce Commission discloses the following—Youngstown Sheet & Tube Co., 90 per cent; Carnegie Steel Co., 85 per cent; Brier Hill Steel Co., 75 per cent; Sharon Steel Hoop Co., 85 per cent; Republic Iron & Steel Co., 70 per cent, and Trumbull Steel Co., 75 per cent. The average for the district is 71 per cent.

An indication of the improved railroad situation is the movement of 13,411 cars in the district on June 9, only 66 cars less than a year ago and 5000 more than a month ago.

Increased Unemployment at Detroit

DETROIT, June 14.—It is estimated that during the past week there were about 25,000 men here out of employment because of curtailment of output by factories, that 10,000 building trades employees were out on strike, and that about 15,000 floaters were idle. This is more unemployment than has existed in Detroit for at least two years.

Production in every plant is far below normal, although some slight improvement in freight and material situations has permitted production increases during the last few days. The automobile factories are averaging only about 50 per cent normal production. Production in the plants of the parts makers is also hard hit.

While it is evident that the census reports will show Detroit's population nearly a million, the report was compiled six months ago. Since then, Detroit's influx of citizens appears to have become an exodus, on account of lack of housing, high prices and poor transportation.

Figures obtained from storage warehouse men and moving van operators, and also from the public school enrollment records, show that families have been leaving the city during the last three months at the rate of about 500 a month. It is estimated that about 26,840

persons, counting single persons, have left the city since March 1, while in the same period about 1312 families and a total of about 11,808 persons moved into the city. This would leave a direct loss of approximately 14,672 persons.

The school enrollment records show quite conclusively that the exodus began about three months ago.

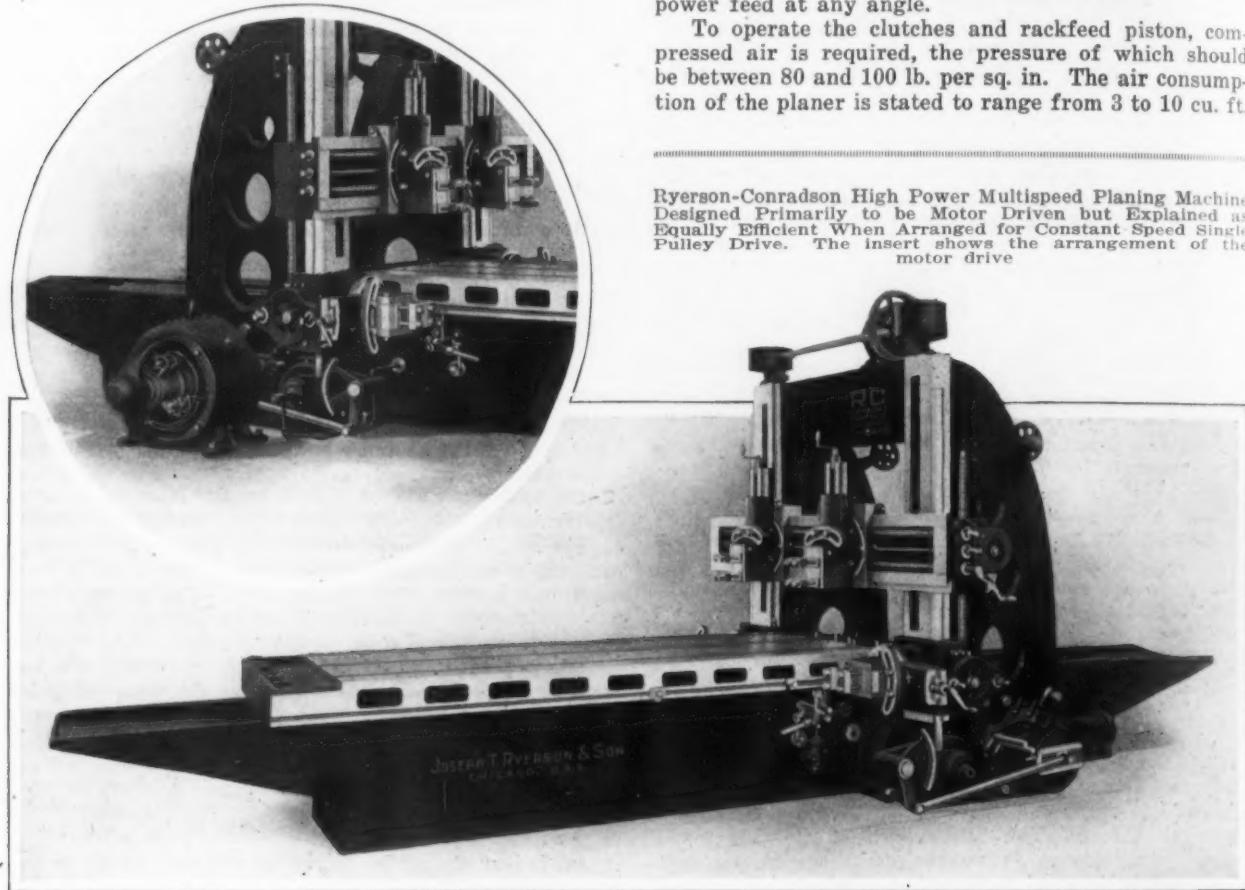
Reasons for Selling Plant

The reasons advanced by the Great Lakes Engineering Works, of Detroit and Ashtabula, Ohio, for selling its plants and going out of the shipbuilding business are that the company's plants are 100 per cent greater in capacity than any normal demand would justify; that present high prices will prevent shipping companies from having more new boats constructed; that no more vessels for Lake use will be constructed for some time to come, and that the company does not feel justified in maintaining the plants with their high overhead for an indefinite period, nor does it feel justified in converting the plants for construction of railway equipment, as has been suggested, owing to the great factor of risk in such a change. It is pointed out that not a single ship for the Lakes trade has been built for the last three years.

High Power Multispeed Planing Machine

A Ryerson-Conradson multispeed planing machine designed primarily to be essentially motor driven, but stated to be equally efficient when arranged for constant speed, single pulley drive, has been placed on the market by Joseph T. Ryerson & Son, Chicago. The design is such, it is explained, as to entirely eliminate high speed reversing parts, thereby to reduce the wear and tear as well as the required power of reversing.

The planer has four speeds and a constant quick return which is independent of the cutting speeds. For general machine shop work, cutting speeds of 25, 30, 37½ and 45 ft. per min. are provided in the heavier



types, with a return speed of 100 ft. per min., all of which may be varied to suit requirements.

The motor is directly connected to the main drive shaft by a Clark flexible coupling. The primary shaft carries two spool gears, and on the extreme end of this shaft the reversing pinion engages directly with the return clutch gear. The change gears are mounted on a square shaft and are shifted by a lever mounted in a gridiron. The pinion on this shaft meshes with the forward clutch gear, thereby giving four cutting speeds.

In order to provide a smooth, durable reversing mechanism, a special form of annular pneumatic clutch is employed, as this type is self-compensating for wear and requires practically no attention. Dogs on the platen trip the distributing valve, alternately admitting air to one or the other of the clutches. As a spacing rod connects the two, one is forced out when the air is admitted to the other, making it impossible to lock the drive gearing. The reversing of the clutch shaft is accomplished in this manner. The back gears, bull pinion, bull wheel and rack are of herringbone design.

The bed is of box section and reinforced. The V's are of special design. The wide supporting surface is inclined 15 deg. to the horizontal, thus to permit the formation of a perfect oil film under severe conditions. The inner leg is inclined 15 deg. to the perpendicular, functioning as a guideway. The proportioning of the two is such that the wear is self-compensating.

The design of the driving mechanism of the rack feed is emphasized as a feature. A piston operated

pneumatically turns the feed regulating disk through 180 deg., the crank of which is connected with levers to a gear segment, raising and lowering the feed rack. The moment the table trips the air distributing valve, air is admitted alternately to one of the clutches as well as the corresponding end of the rack feed piston.

The elevating screws are driven by a motor mounted on a cross girt, the entire elevating mechanism consisting of spur reduction gears and a set of bevel gears, the latter placed directly on the elevating screw.

The cross rail is of standard construction, permitting individual traverse and feed of each head in either direction. The heads on cross rail and side heads all have power angular feed. The side heads have power vertical traverse the full length of travel, and also power feed at any angle.

To operate the clutches and rackfeed piston, compressed air is required, the pressure of which should be between 80 and 100 lb. per sq. in. The air consumption of the planer is stated to range from 3 to 10 cu. ft.

Ryerson-Conradson High Power Multispeed Planing Machine
Designed Primarily to be Motor Driven but Explained as
Equally Efficient When Arranged for Constant Speed Single
Pulley Drive. The insert shows the arrangement of the
motor drive

of free air per min., from the smallest to the largest size planer. For shops not having a compressed air system suitable means for connecting a small standard compressor directly to the main drive shaft is provided.

The United States Civil Service Commission announces an examination by mail for plant engineer at \$5,000 a year. The applicant must have had at least 10 years experience in engineering work in steel plants that manufacture ordnance material, armor plate, guns, projectiles, etc., at least three years of which must have been spent as supervisor of engineering work. Each completed year of an engineering course in a college or university of recognized standing will be accepted as equivalent to one year of preliminary engineering experience. Applicants should apply for form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, or the secretary of the United States Civil Service Board at the nearest custom-house.

Plans are now under way whereby Battle Creek, Mich., may be the location of Grand Trunk Railway locomotive shops where all engines used by the entire system will be constructed, and correspondence is being carried on with the head offices at Montreal in this connection. One locomotive has been constructed in the Battle Creek shops and was so economically built that another was ordered and is now under construction. The company is said to be seriously considering building all or at least most of its own engines.

STELLITE AND STAINLESS STEEL

A Discussion of Development, Composition, Physical and Chemical Properties and Uses

Stellite and stainless steel were the subjects of an interesting paper recently presented before the Engineers' Society of Western Pennsylvania, Union Arcade Building, Pittsburgh, by Elwood Haynes, president Haynes Stellite Co., Kokomo, Ind. The paper is given largely in full below:

The three metals, iron, nickel, and cobalt, are termed by chemists the "metals of the iron group." The reason for classifying them thus is the fact that their respective properties are all quite similar.

- 1.—They are all distinctly malleable.
- 2.—They are all distinctly magnetic.
- 3.—They possess high tensile strength and high modulus of elasticity.
- 4.—When pure they take a high polish and show a distinct metallic luster.

They also resemble one another in their chemical properties.

- 1.—Each is readily soluble in nitric acid.
- 2.—Each form a monoxide with oxygen, as FeO , NiO , and CoO . Each also forms a sesquioxide, Fe_2O_3 , Ni_2O_3 , and Co_2O_3 .
- 3.—Aqueous solutions of their chlorides, when evaporated to dryness, are transformed into oxides.
- 4.—Their oxides are all readily reduced by either carbon monoxide or hydrogen.
- 5.—Their melting points coincide quite closely.
- 6.—Their atomic weights are quite close together, that of iron being 56, and those of cobalt and nickel approximating 59.

When solutions of cobalt and nickel are mixed, it is difficult to separate the metals one from the other, owing to the fact that their behavior under most precipitants is practically the same.

Composition of Stellite

In 1899, the writer produced an alloy consisting of practically pure nickel and pure chromium by heating their mixed oxides with aluminum. This alloy, when polished, retained its luster, even in the atmosphere of a chemical laboratory, and proved to be practically insoluble in nitric acid, even when boiling. It is also malleable when cold, and under proper annealing can be worked into sheets and wire.

Shortly afterward, an alloy of cobalt and chromium was produced, which not only showed the same untarnishable properties as the nickel-chrome alloy, but possessed much greater hardness. The alloy could not be worked to any extent cold, but was found to be malleable at a bright orange heat.

It was not until 1906 that the alloy was produced in sufficient quantity to determine its properties fully. In 1909, a cutting blade was made of the alloy, which took an edge comparable to that of tempered steel. Later, tungsten or molybdenum was added, and the alloy thus produced was sufficiently hard to turn iron and steel on the lathe. Later experiments demonstrated that such alloys when properly formed, would scratch any steel, and would stand up under much higher speeds on the lathe than the best high-speed steel tools. This fact gave the cobalt-chromium-tungsten alloy termed stellite (from the Latin word, *stella*—a star) a field of its own, and placed it in a class by itself as a material for high-speed tools.

Generally speaking, the cobalt-chromium alloys possess three distinctive properties; namely:

- 1.—They are untarnishable under all atmospheric conditions, and immune to nearly all chemical reagents.
- 2.—They possess great hardness.
- 3.—They retain their hardness up to visible redness.

Festel Metal

Some of the stellite articles for ordinary use are formed from alloys of cobalt and chromium only. This alloy answers well for table knives, spoons, etc. The harder edge tools, such as pocket knives, surgical instruments, etc., contain in addition to cobalt and chromium a certain amount of tungsten to give them

greater hardness, while in other instances a certain amount of iron is introduced into the alloy to soften it so that it may be more readily worked. Such articles include table-knife blades, pocket-knife handles, certain dental instruments, etc. When iron is added to the alloy, the resulting mixture is termed "Festel metal," being made up from the chemical symbol for iron (Fe) and the first syllable of stellite.

This beautiful and easily workable alloy is well adapted to the manufacture of fine door latches, door-knobs, and high class sanitary fittings for bathrooms, lavatories, etc. It is not malleable except at a bright red heat, but when a certain portion of nickel is added it may be worked cold on the lathe or under the file. By suitable means, it can be given a beautiful stippled surface resembling that of frosted silver, and it is needless to add that under all conditions it retains its luster in the most satisfactory manner.

Some of the later stellite alloys have shown most remarkable resistance to chemical reagents. One of these, possessing quite high chromium, takes a magnificent polish, resembling that of burnished silver. This alloy retains its luster perfectly in boiling *aqua regia*, and is not affected in the slightest degree after immersion in that liquid for a period of 14 days. It is slowly attacked by cold, strong sulphuric acid, but is practically immune to cold, strong sulphuric acid, and nearly immune to the same acid in the diluted form. It is strictly immune to nitric acid of all strengths.

Balance weights made of this material retain their luster under the most trying conditions. They present a beautiful appearance, owing to their superb luster, and are so hard that their loss from ordinary wear will be perhaps unweighable for several years.

History of Stainless Steel

In the year 1911, I made some experiments on alloys of iron and chromium with a view to ascertaining definitely their properties. I quote from my notes as follows. [Mr. Haynes gives memoranda from his note book, made in 1911 and 1912, of tests of alloys of varying quantities of iron and chromium.]

The experiments recorded above distinctly show that the non-corrosive qualities of chrome-iron and chrome-steel alloys were not only discovered by the writer at the time specified, but that their physical properties were also fully demonstrated. The discovery rests not on the possibility of adding to the steel other elements which may render it more or less immune to corrosion, more easily or less easily workable, but upon the fact that immune chrome-steels must contain more than 8 per cent chromium, though for certain purposes they may contain much more than that amount, even up to 60 per cent; that such steels are distinctly workable and useful, whether subjected to heat treatment or not; furthermore, that the proportion of carbon may be raised as high as 2 per cent without materially interfering with the untarnishable qualities of the alloy, though such alloys are generally speaking, more easily worked if the carbon is below 1 per cent.

Numerous metals may be added to stainless or rustless steel, and some of these may contribute slight benefit, while others may be slightly detrimental. Among these are nickel, cobalt, vanadium, silicon, boron, tungsten, molybdenum, titanium and tantalum. It is evident that an indefinite number of alloys could be thus formed some with and some without the above elements, but none would be stainless unless it contained the proper amount of chromium, which is the essential element to be added to nickel, cobalt, or iron to produce a stainless alloy.

About two or three years after the discoveries recorded above Harry Brearley, of Sheffield, England, discovered practically the same properties in chrome-steel, and I am practically certain that his discovery was made independently of any discoveries made by me.

Immediately after making the discoveries recorded above, I applied for a patent, but my application was not at first granted, on the ground that chrome-steels were not new. Without going into details, I will say that I later made a second application, and that about fifteen days later, Mr. Brearley filed an application

for practically the same thing. The United States Patent Office granted a patent to Mr. Brearley on the ground that his application contained a provision that it was necessary to polish and harden the steel in order to render it immune. This, however, was later found not to be correct, and in May of this year practically all of the claims in the application of the writer were granted by the Patent Office.

A personal service corporation was formed in this city, to which both the Haynes and Brearley patents were assigned, and licenses have now been granted to the principal steel makers for the manufacture of stainless steel under these patents. This corporation is the American Stainless Steel Co., with offices at present in the Oliver Building, Pittsburgh.

Properties of Stainless Steel

Stainless or rustless steel consists essentially of an alloy of iron and chromium, containing usually from 0.1 to 1 per cent of carbon, though the latter element may be present up to nearly 2 per cent without interfering seriously with the working qualities of the steel.

Owing to the high percentage of chromium and its tendency to oxidize at the melting point, even in the presence of carbon, it has been found advisable to melt the steel either in crucibles or in the electric furnace. After melting, the metal may be poured into ingot molds in the usual manner, and the ingots thus obtained may be forged or rolled into bars or sheets. If the ingots are of comparatively small size, they will be found to be very hard after casting, especially if they have been stripped hot and allowed to cool rather rapidly in the air. Indeed, small bars thus produced are likely to be almost file hard.

If a small piece of the steel thus produced be placed in a beaker with a piece of ordinary steel and covered with nitric acid, the ordinary carbon steel will be dissolved with great violence, while the chrome-steel will remain utterly unchanged, thus proving that its immunity is primarily due to its composition. This is true whether the steel contains carbon in large or only minute quantities.

Cold chisels cast in iron or graphite ingot molds are sufficiently hard, without tempering to cut ordinary iron or steel.

By heating cast bars to a bright orange temperature, they can be forged pretty readily into various forms. After the forging is completed, the metal may be allowed to cool in the air, and will be found to possess remarkably fine grain and good cutting qualities.

Quenching in water enhances the hardness to a considerable degree, particularly if the steel contains more than 0.4 per cent carbon. It is best, however, to use oil for quenching, in order to avoid local contraction stress in the finished article, which might cause it to break under slight shock or jar.

Notwithstanding the comparatively high temperature of working this steel, the bars show almost no scale during the forging operation, and when finished are covered with a blue-black "skin" consisting of a thin film of oxid.

Owing to the absence of deep oxidation and resistance to deformation at comparatively high temperatures, the alloy is admirably suited for casting engine valves and distilling apparatus, and for many other purposes of like nature. When ground and polished, the alloy resists tarnish to a remarkable degree. It is superior in this respect to brass, copper, and nickel plate, and far superior to any other steel yet produced. Axes, hatchets, saws or chisels made from it, not only will not rust in the atmosphere, but are unchanged when exposed to salt water or salt air. It will likewise doubtless find a large use in the manufacture of propeller blades for steamers, since its modulus of elasticity is much higher than that of bronze, and it resists the action of both fresh and salt water perfectly. Its great strength and comparatively high elastic limit are likewise in its favor. It will doubtless also have a large application in the manufacture of pump-rods, cylinder linings, pump valves, etc.

It is slowly attacked by dilute or strong sulphuric

acid, and also by hydrochloric acid; but nitric acid has little or no effect upon the polished surface of the metal. When properly made it is impervious to practically all the fruit acids, including strong vinegar.

The alloy will fill a long-felt want among carpenters and others using wood cutting tools, since its freedom from rust, together with its capability of taking a keen cutting edge, renders it admirably suited for wood working tools. As noted above, it has been made into auger bits, and these have remained bright for years under all sorts of atmospheric influences.

DISCUSSION

In answer to a question as to the tensile properties of stellite, Mr. Haynes stated that "a good representation of malleable stellite would be 80,000 lb. elastic limit, 110,000 tensile strength, and with an elongation of 9 per cent."

Relative to the use of stellite during the war, he said: "We have no definite record, but our men claim that stellite was used in the rough turning of three-fourths of all the shrapnel made in this country during the late war. The last year of the war we delivered about three million dollars' worth of stellite, for war purposes principally."

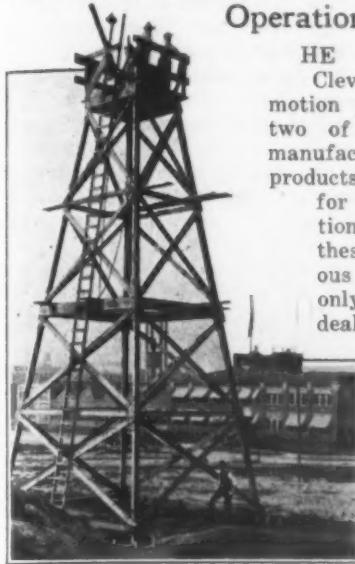
In answer to a question as to erosion on stellite from the effects of abrasion, such as the wear from water rapidly passing over the surface of the parts of a pump runner, Mr. Haynes explained that "it is very satisfactory. In the first place it is harder to grind than any steel, because steels do not resist erosion or abrasion to any remarkable extent. The hard alloys do not show as high scleroscopic or Brinell tests as the high speed steels, but they work very much better because their abrasive hardness is very great. These two properties are not always fully understood. Some of us have thought that if we put a bar of steel under the scleroscope and it shows a high test, it is an extremely hard steel which would resist abrasion. A steel of that kind has a high elastic hardness, but not necessarily a high abrasive hardness. A vanadium steel of moderately high carbon and hardness will throw the hammer very high and the scleroscope test may show a hardness of 90, but at the same time you can take a file and file it with ease. Stellite alloys are just reverse. They show a low elastic hardness and a very high abrasive hardness."

The United States Civil Service Commission announces examination by mail for assistant mechanical engineer at \$1,680 a year, plus a temporary increase of \$20 a month. The applicant must have graduated with a B.S. degree from an engineering course in a college or university of recognized standing and have had three months experience in engineering requiring considerable computation work similar to that required by the duties of this position. Applicants should apply for form 1312, stating the title of the examination desired, to the Civil Service Commission at Washington, or the secretary of the United States Civil Service board at the nearest customhouse.

The United States Civil Service Commission announces an examination by mail for metallurgist, at \$3,600 to \$4,000 a year. The applicant must have graduated in mining engineering or metallurgy from a college or university of recognized standing, and have had at least five years of responsible experience in such work. Applicants should apply for form 2118, stating the title of the examination desired, to the Civil Service Commission, Washington, or the secretary of the United States Civil Service Board at the nearest Custom House.

The Ordnance Department, Boston, is to auction off all materials, machine tools, equipment, etc., Government owned, held under the Boston district. The auctions will be held at various points where large amounts of materials are held. The first sale probably will be held at the Scituate Proving Grounds. Final details are being worked out, but it will be at least six weeks before a sale actually takes place.

Motion Pictures Show Manufacturing Operations



THE National Acme Co., Cleveland, recently had motion picture films made in two of its plants, showing manufacturing operations and products and has arranged for a very wide distribution and presentation of these films through various channels that will not only result in a great deal of general publicity for the company's products, but also will doubtless prove very entertaining to many audiences because of their educational value.

The company had two films made, one an advertising film in four reels showing

its Coit Road products plant in Cleveland, and the other a technical film in two reels showing the construction and operation of its Gridley automatic screw machines. In addition another film descriptive of the Acme automatic screw machines and designated as an educational service film is planned.

In the film of its Coit Road plant entitled "Spirit of Progress," a typical product, an automobile spring bolt, is taken as a subject for a picture story and the eleven manufacturing operations that are required in making this product from the time the raw stock is received until the finished bolt is ready for shipment are shown, not only in general department illustrations, but also in close-up views that clearly show the various operations. Views also include the office details in connection with the order, such as its inspection and checking, and the progress of the order itself until it finally reaches the manufacturing departments. The views also show manufacturing operations, methods of handling material, provisions for the comfort of the employee, the employees' dining room, and the school in which English and hygiene are taught both to men and women employees, with separate schools for each sex. A great deal of time was spent in securing good photographs. An instance of this was the erection of a 60-ft. tower for taking a single picture showing the exterior of the plant.

Two means have been adopted for exhibiting this film. One is through the Bureau of Commercial Economics, Washington, which shows the picture from automobile trucks equipped with moving picture machines. Six trucks, used for this purpose, were routed through industrial centers and showed the pictures in city parks, playgrounds and on the streets, to 93,000 people in eight New England cities in one month, the average attendance being 3700 at each exhibition.

The other method of showing the film is through established bureaus, such as chambers of commerce, boards of trade, technical schools, etc. From these centers the film, together with educational and historic subjects and travel, is distributed to manufacturing plants, community centers, schools, etc. Twenty of these centers have been selected from which the film is distributed without expense except transportation charges on the film. The company also has several films for its own direct distribution before technical societies and in manufacturing plants. Many of these have their own picture machine, so that it is only necessary to send the film.

The technical film produced from pictures taken at the company's Windsor, Vt., plant and showing the construction and operation of its Gridley automatic screw machine and various features of the plant, was made particularly to exhibit at the company's branch offices abroad. In this country this film will be supplied to technical schools and to plants of prospective customers.

Railroad Classification of Scrap Iron

The controversy, which has been raging between the railroads and shippers in reference to what is, or what is not, entitled to be classified as scrap iron, is evidently concerning Pacific Coast dealers more than eastern dealers, according to the June 8 bulletin of the National Association of Waste Material Dealers, Inc., New York. Both the president and secretary of the national association recently visited the dealers in the extreme western part of the United States. They report that in some cases the railroad inspectors are going so far as to rule that scrap material, to be entitled to a scrap iron rating, must be so broken up as to entirely lose its identity. The matter of placing the scrap dealers' side of the controversy before the Interstate Commerce Commission was again considered at the quarterly meeting of the association at the Hotel Astor, New York.

F. W. Reidenbach, Rochester, N. Y., president of the association, has been conducting a campaign through the country for the elimination of the term "junk" and for the substitution of the terms "waste material." He says that 5000 waste material men in the big cities of the United States are doing an aggregate annual business of \$1,000,000,000. "Having attained such a high standing in the business world, they are now seeking to put themselves on a more dignified plane," he said. "The fact is we are not dealing in junk at all. The public has been misinformed for years as to what we are really doing. We are dealers in by-products. Manufacturers couldn't get along without us, and the Government knows we are a great force in conservation."

Question of Costs Is Important

W. H. Van Pelt, of the Cincinnati Ball Crank Co., addressing the Cincinnati Cost and Planning Association, declared that the big question confronting manufacturers to-day is how much will it cost them, or how cheaply can they afford to sell their products in view of the fact that certain expenses are maintained, whether their plants are in operation or not. When times are prosperous and the volume of orders and shipments is considerably over normal capacity, cost accounting is not so important a factor as it becomes when orders are being cancelled and shipments are not being made due to freight conditions or general business conditions. Mr. Van Pelt stated that it was his belief that under the present financial condition of the country, the question with manufacturing concerns is not how much it has cost to produce their products, but how cheaply they can take an order, and how much will they lose if they fail to take on business. This is a problem cost accountants should be able to answer from their records.

Speeds and Feeds in Cutting Metals

The accompanying table of speeds and feeds in machining various metals, has been suggested for use throughout the Lynn Works, General Electric Co., West Lynn, Mass., to supersede one recommended

Table of Speeds and Feeds

Material	Heavy Cut		Light Cut	
	Speed Ft. Per Min.	Feed In.	Speed Ft. Per Min.	Feed In.
Steel, cold rolled..	70	1/8 and up	140	0.01 and up
Steel, mach.....	60	1/8 and up	120	0.01 and up
Steel Spec. 502....	60	1/8 and up	120	0.01 and up
Steel Spec. 705....	50	1/8 and up	100	0.01 and up
Steel Spec. 517....	30	1/8 and up	85	0.01 and up
3 per cent nick. steel.	30	1/8 and up	60	0.01 and up
Steel casting.....	50	1/8 and up	75	0.01 and up
Iron casting.....	50	1/8 and up	75	0.01 and up
Iron malle.....	50	1/8 and up	75	0.01 and up
Alloy No. 2.....	150	1/8 and up	200	0.01 and up
Alloy, Nos. 4, 21, 23	100	1/8 and up	150	0.01 and up
Brass rod.....	150	1/8 and up	200	0.01 and up
Copper rod.....	150	1/8 and up	200	0.01 and up
Aluminum.....	200	1/8 and up	200	0.01 and up
Babbitts.....	400	1/8 and up	400	0.01 and up
Copper seg. commutators ...			500	0.02 and up

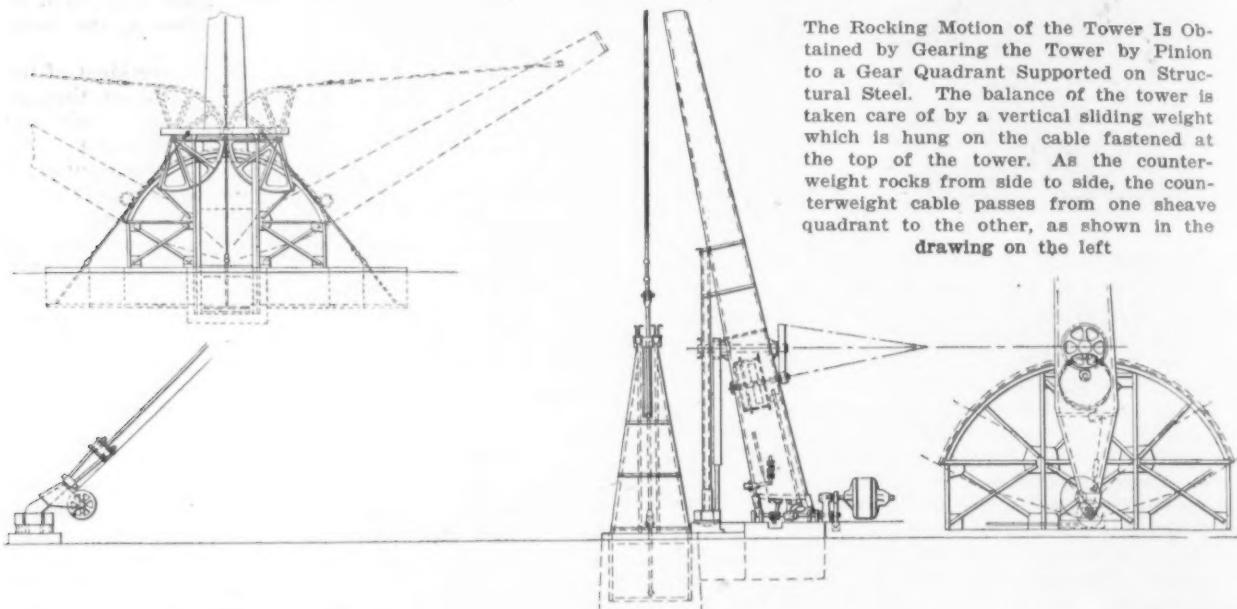
April 7, 1910, and in general use since then, the speeds to be considered as minimum for the material specified.

Improved Cableway for Storage Yards

Recent improvements in cableways which make them useful for giving crane service over storage yards have been made by the N. T. Harrington Co., 538 Schofield Building, Cleveland. The equipment aims to eliminate the handling of the material to conveyor or car by furnishing a high longitudinal speed along the pile, making it possible to travel a considerable way from the plant, pick up a load and convey it rapidly to the plant or vice versa. This has been accomplished by adopting the cableway principle which affords high longitudinal speeds with light moving weight of operating parts, and the lateral service is provided by means of a rocking motion which is given to terminal towers,

Where necessary, piles can be made of great height by increasing the height of the two booms only. It is explained that in balancing, all of the dead weight of booms, cables, carriage, bucket, and such portion of the live load as is desired can be accurately balanced and the balance is perfect regardless of the position of the towers, or the location of the carriage and the main cable.

The rocking motion is obtained by gearing the tower by pinion to a gear quadrant supported on structural steel, and rock of the tail tower is kept in unison with the hoist tower by two cables stretched between the towers which operate the mechanism in the tail tower, working through a pinion and gear segment similar to that at the hoist tower. Suitable automatic stops and



these towers being rocked in unison so that the main track cable is transferred laterally.

The towers are balanced by counterweight for any angle of inclination which they may have. The rocking of the towers is done independently of the travel of the carriage on the main track cable and the hoisting and travel functions are operated in the same way as in ordinary cableways. This makes a light and fast method of handling either bulk material or material which is ordinarily served with a crane hook. It makes it possible to pile or deliver in selective piles, as movement from pile to pile is rapid.

Owing to the sweep of the main cable which follows very closely the contour of a natural pile, all that can be piled can be reclaimed. No retaining walls or trestles are required, as cars can be unloaded from the top or dump bottom cars can be dumped into track hoppers from which the load can be taken.

Owing to the angle of rock, the hoisting of the load is a short distance, and if a car is being unloaded it is only necessary to hoist high enough to clear the pile or side of the car, after which the bucket will clear the pile without further hoisting. The bucket is always parallel to the car when loading or unloading, as there is no rotary motion to be overcome. The yard is left clear of obstructions of any kind.

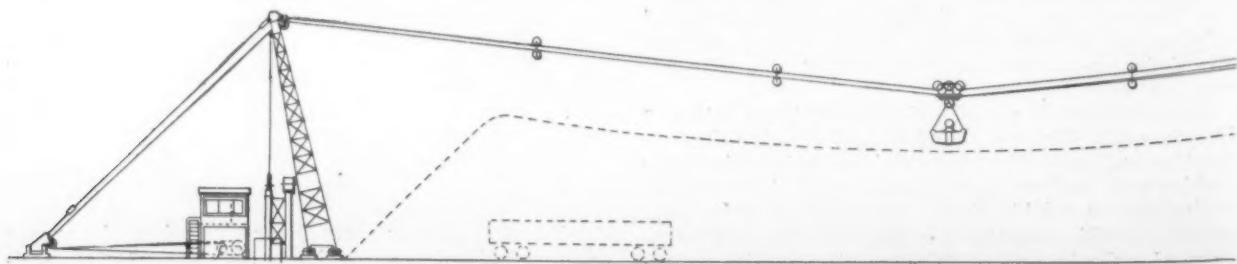
The width of the pile is 70 per cent greater than the height of booms for lengths up to 400 ft. of cableway.

The Rocking Motion of the Tower Is Obtained by Gearing the Tower by Pinion to a Gear Quadrant Supported on Structural Steel. The balance of the tower is taken care of by a vertical sliding weight which is hung on the cable fastened at the top of the tower. As the counterweight rocks from side to side, the counterweight cable passes from one sheave quadrant to the other, as shown in the drawing on the left

safety stops are provided to cut out over-travel and in case of rope breakage. The strain of the main cable is taken by guys which are connected to oscillating anchors, the oscillating anchors being in line with the pivots of the main towers so that regardless of the position of the towers the length of guy and main cable is not altered.

The device gives fast crane service over depressions in the ground, as the main cable can be stretched across openings where it is impossible to get supports or tracks for any other sort of mechanism. It can be operated either by steam or electricity and requires only one operator. The operating ropes are carried from the hoist to sheaves at the main anchor and then to the top of the tower. This arrangement prevents variation in the length of the operating cable as the towers are rocked. The hoists are standard cableway hoists and can be used to operate with any type of bucket or crane.

The balance of the tower is taken care of by means of a vertical sliding weight hung on the cable which is fastened at the top of the tower. When the tower rocks to one side this cable lies over a sheave quadrant which is located in such relation to the motion of the tower as to increase the effective resisting angle between the cable and the center of the tower. This means the weight can be balanced exactly for any angle of inclination. As the tower rocks from side to



Cableway Which Gives Crane Service Over Storage Yards. Lateral service is provided by a rocking motion

side, the counterweight cable simply lays off of one sheave quadrant on to the other, and when the tower is vertical the counterweight effect is zero, the maximum effect of counterweight occurring when the towers are at the limit of their travel at one side or the other.

The arrangement is applicable to blast furnace yards, crushed rock storage, storage for cement mills, lumber yards, structural steel storage, foundry yards and all yard storage of this class.

Report of Industrial Fellowships of the Mellon Institute

The seventh annual report on the industrial fellowships of the Mellon Institute of Industrial Research, University of Pittsburgh, is now available. According to this system of research, an industrialist, a company, or an association of manufacturers having a problem or group of problems requiring investigation may become the donor of an industrial fellowship by contributing to the Mellon Institute a definite amount of money for a period of not less than one year. This foundation sum must be adequate for the purchase of all necessary special apparatus or other equipment as well as to furnish the annual stipend of the research man or men selected to work on the particular problem, the solution of which is of interest to the donor. Each industrial fellow is selected carefully by the institute, and the work to be done is committed to this man who is not otherwise preoccupied. The institute houses the investigatory work, furnishes it with the use of its permanent equipment, affords library and consultative facilities, gives careful direction to the progress of the research, and provides an atmosphere which is conducive to productive inquiry. All results obtained during the course of the industrial fellowship belong exclusively to the donor.

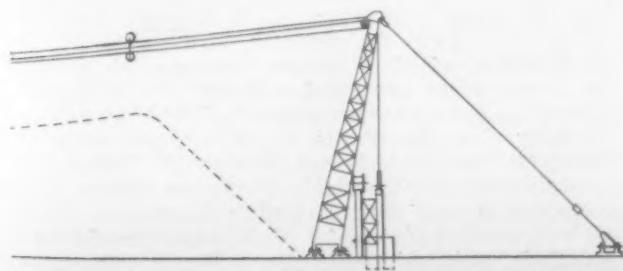
The number of fellowships has grown from 11 in 1911-1912 to 47 in 1919-1920, the number of fellows from 24 to 83, and the total foundation sums from \$39,700 to \$293,680. Industrial fellowships in operation at the institute on March 1, 1920, included aluminum, enameling, protected metals, leather belting, copper, zirconium, copper, magnesia, coke, refractories, by-products, etc.

Midwest Engine Co. Utilizes Motion Pictures

Motion picture films as an aid to marketing its products at home and abroad have been recently prepared by the Rothacker Film Mfg. Co., 1339 Diversey Parkway, Chicago, for the Midwest Engine Co., Indianapolis. Films showing the company's Utilitor, a general farm utility machine, are used by distributors, dealers and district men who are supplied with motion picture machines.

The machines are shown plowing, cultivating, operating belt-driven machinery, etc., as a demonstration to prospective buyers.

Reels of particular value in the work of a distributor representing the Midwest products abroad show the actual production of such units as steam turbines, pumps, heavy oil engines, etc. A number of these reels were taken in the company's plant at Indianapolis and Anderson, Ind., to show production from the arrival of raw materials to the inspection and shipment of the finished product, while others were taken in various cities, in customers' plants, and show installations and actual performance of such equipment as engines, turbines, pumps, etc.



of the terminal towers, these towers being rocked in unison so that the main track cable is transferred laterally

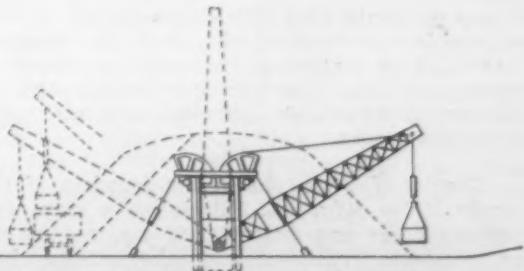
Hard Places in Castings Caused by Pressure Segregation

Prof. Bernhard Osann discusses in *Stahl und Eisen*, Jan. 29, 1920, some cases which have come to his notice of a phenomenon which he terms "pressure segregation," a special type of segregation which is set up by internal pressure in the interior of a cooling metal which drives the still liquid metal outwards through the solid outer skin. This phenomenon is a frequent concomitant of piping, especially in rings used in wire-drawing and in bronze castings. The writer, says *Technical Review*, London, discusses a case in which a cast cylinder showed the phenomenon to a marked degree and which was typified by the presence of numerous hard places in the form of white spots which were discovered on turning the roll and which led to its rejection. The roll in question was cast from a melt obtained in a reverberatory furnace, and the melt had probably "run" and become thick. Considerable decarburization resulted and thus caused a considerable drop in the carbon content. The fracture of the metal investigated was gray, surrounded by a white ring. The writer states that the white iron is a skeleton which remained after the liquid part had been driven outward and penetrated the metal in the mold in the form of drops.

Electric Supply for Electric Steel Furnaces

The connection of electric furnaces to electric supply systems is becoming increasingly frequent, particularly for the production of high-grade steel, in which case the cost of the current is a negligible proportion of the total cost of the product.

E. F. Russ, in the *Electrotechnische Zeitschrift*, Jan. 15, 1920, says that, according to *Technical Review*, London, it is important from the point of view of the manufacturer that the supply of electricity be drawn from public mains, and for this to be possible the furnaces must be acceptable to the supply company and the supply station must be large enough to guarantee continuity of supply with all possible calls, as the interruption of the running of a furnace is a very costly matter. The objections that are raised to the supply of current for furnaces are their low power factor and the large fluctuations of the current taken. The latter trouble may be mitigated by using transformers with large leakage reactance, or, as a less costly method, by winding the conductors carrying the heavy currents to the furnace with strips of iron to increase their reactance. A further possibility is the insertion of choking coils in the circuit of the furnace, and this has the advantage that the coils may be cut in or out of circuit or adjusted to meet varying requirements. The flattening out of fluctuations of current by these methods is unavoidably associated with lowering of the power factor, but the current rushes may be limited to 1.8 times the normal value with a power factor of 0.8. Stabilizing the arc is of great utility in rendering the connection of furnaces to the supply circuit less objectionable. Several special forms of choking coils designed for this purpose are described, and also devices in which three-phase current is used with 4 electrodes. It is recommended that the neutral electrode should not be used for arcing, but should be directly connected to the melt. Stabilization may also be achieved by using mechanical devices for keeping the arc length constant. The article concludes with a description of various types of furnaces.



Large Straight Side Press

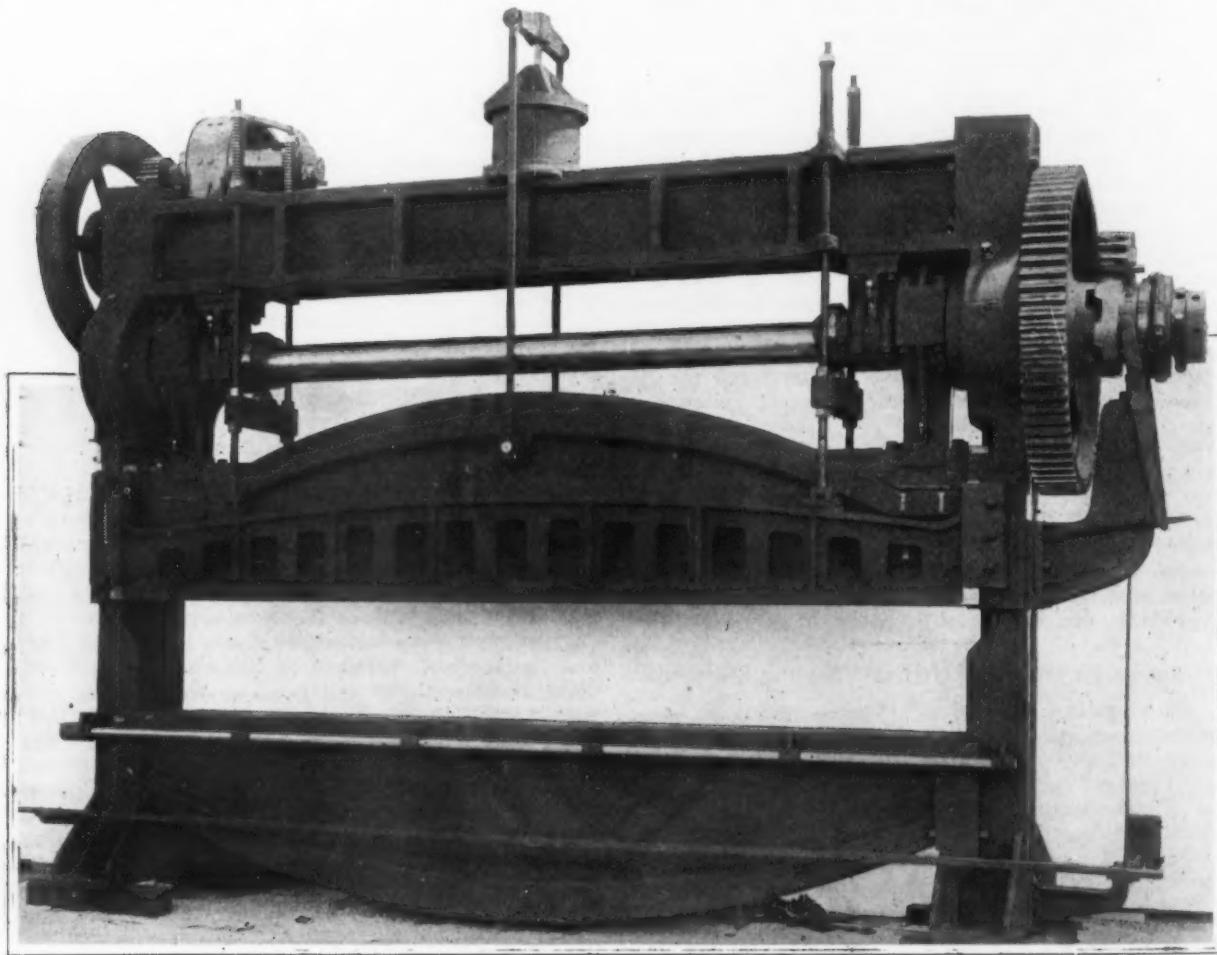
The accompanying illustration shows a large straight side press known as No. 40-A, recently completed by Williams, White & Co., Mobile, Ill., and to be used for punching side rails for motor cars. The capacity of the press is 600,000 lb., distributed load.

There is a clear distance between the housings of 16 ft. The vertical die space with ram down is 24 in. and length of stroke 5 in. The table is 24 in. in width and the ram 16 in. Normal speed is 25 strokes per min. The air counterbalance is designed to operate at 80 to 100 lb. pressure. Adjustable front and rear clamping strippers and side clamping devices, actuated from the main shaft, are provided. The drive is by a direct-connected General Electric 50-hp. direct-current motor running at 775 r.p.m.

A friction slip flywheel protects the machine, in case dies are jammed, by allowing the flywheel to mo-

Dr. Arnold's New Molybdenum Steel

During the past week information has appeared in both the London and Sheffield papers relating to the plans which have been formed to put upon the market Dr. J. O. Arnold's molybdenum high-speed steel, says the London *Ironmonger* of May 15. Dr. Arnold, who has been recuperating after a severe breakdown for some months, has so far recovered that he has been able to conclude the sale of his production rights, and plans are being completed to manufacture and market the steel. J. D. Moffat, a director of Sir Thomas Salter Pyne & Co., Ltd., of Victoria Street, Westminster, is actively interested, and it was expected that an announcement might have been made this week respecting the works at which the new steel would be made. Matters, however, have taken a turn which necessarily postpones the completion of the business. It was intended at first that a company to deal with the inven-



Straight Side Press, Capacity of 600,000 Lb., Distributed Load, for Punching Side Rails for Motor Cars

mentarily continue rotation against friction, thus to gradually dissipate the contained energy. The flywheel is clamped upon an extension of the motor gear hub, which in turn is keyed to the main shaft. Two pitman arms are used, and are placed, with their driving eccentrics, closely against the housing with the two intermediate bridge tree bearings immediately adjacent, thus to distribute operating strains and stresses. The pendulums oscillate in steel thrust blocks set into the ram.

An automatic stop clutch is employed. This has an automatic throw-out which, when the treadle is released, leaves the ram at the top of its stroke and prevents repetition. The treadle is hooked down for continuous operation, or depressed separately for each successive stroke.

Charles H. John, one of the founders of the Wisconsin Motor Mfg. Co., Milwaukee, a large maker of passenger car and motor truck engines, has resigned as president and treasurer in order to take a long rest. Hugo P. Schnetzky succeeds him.

tion should be formed, which would purchase a controlling interest in a Sheffield works; but information now is that the company will probably find itself in a position to secure controlling interests in more than one concern. Offers are said to have been received from several Sheffield steel makers, and these are now being considered by the directors of the new company.

The Buffalo section of the American Society of Mechanical Engineers has elected the following officers for the season 1920-1921: B. S. Hughes, chairman; W. J. Gamble, vice-chairman; W. W. Boyde, secretary; C. A. Booth and W. M. Dollar, treasurer. Mr. Hughes is vice-president and chief engineer of the Taremba Co. Mr. Gamble is superintendent of the Vulcan Steam Forging Co.; Mr. Boyde is an engineer with the Niagara Machine and Tool Works; Mr. Dollar is a consulting engineer, and Mr. Booth has charge of the engineering sales for the Buffalo Forge Co. W. B. Powell, member of the A. S. M. E., and formerly chairman of membership committee work for this section, is now president of the Engineering Society of Buffalo.

RULING IN ADVANCE

Important Subject Will Probably be Considered at Next Session of Congress

WASHINGTON, June 15.—Legislation making it possible for a business concern to obtain a ruling in advance on the legality of a proposed course of conduct will be up for consideration during the next session of Congress. This is indicated by a declaration in the Republican platform adopted at Chicago, and also by a statement by W. B. Colver, member of the Federal Trade Commission, in a recent address.

The Republican platform, while approving in general the existing Federal legislation against monopoly and combinations in the restraint of trade, advocates such an amendment as will provide American business men with better means of determining in advance whether a proposed combination is or is not unlawful.

Mr. Colver in a discussion of the situation admitted that the present anti-trust laws are so inflexible as to cause hardship. The multitude of decisions handed down, Mr. Colver pointed out, "have through necessity created a zone of doubt through which business has to pass, and yet through each step it takes it fears a pitfall."

Mr. Colver said that the bill introduced during both of the past two sessions of Congress by Representative Steel of Pennsylvania, seemed to him to offer a reasonable solution. This bill provides that any concern about to embark in any course of conduct may come voluntarily to the Government, and set out clearly just what he intends to do. This expression of intention is to be received, and the business concern is to be given an acknowledgement of the receipt of his declaration. He may then go back and carry on his business in accordance with his expressed intention, and until some citizen shall come forward to complain either that the public interest or business institutions are being definitely injured by that course of conduct, the license granted shall be a complete defense in any court of law or before any Government agency against any charges of breach of law.

Mr. Colver expressed the belief that some such arrangement as that would bring to American business men the desired flexibility in the law.

Moving Coal by Permits

WASHINGTON, June 15.—As a means of aiding in improving the car situation, the Interstate Commerce Commission has issued an order placing the movement of coal assigned to Lake Erie ports for transshipment by water under the permit system. The issuance of permits is to be under the control of H. M. Griggs, manager of the Ore and Coal Exchange, Cleveland, who is in charge of the pool of railroads and Lake carriers for the movement of bituminous coal to the Northwest by Lake during the summer months.

The order of the commission provides that the railroads are authorized and directed until further notice to give preference and priority to carloads of bituminous coal consigned to the Ore and Coal Exchange at any Lake Erie port for transshipment by water either as cargo or bunkerage coal. The railroads are further directed to place an embargo upon the supply of cars for, or movement of, all other bituminous coal in carloads to Lake Erie ports, except on permits issued by Mr. Griggs.

Contracting for Coal and Coke Is Delayed

UNIONTOWN, PA., June 15.—Despite the fact that contracts for third quarter and second half usually are made long before this date, little has been done along that line in the coal and coke industry due to the soaring market, general transportation conditions and other factors which have entered into the readjustment. Consumers have manifested extreme reluctance to bind themselves for a stated price to cover a six months period and operators and producers as well are equally reluctant. The most generally approved basis

so far has been a system of monthly price adjustments and it is indicated that most of the contracts will be upon this plan. Present contracts which expire July 1, generally, have a basic figure at around \$8.50, ovens, for coke and neither side is willing to accept these figures for the last half delivery.

Indications now are for an open market with a greater tonnage during the six months than for some periods. Since the Government price fixing was abandoned, the spot market attained an activity that has not been apparent since 1917 and in which coke prices mounted to \$15, ovens, and coal to around \$8.25, mines.

Steady gains in output during the past month, it is believed, mark the turn in production and the general belief is that consumers will be able to cover their summer needs very handily. The greatest problem confronting the Connellsville coke region now is the freight transportation.

Proposed Ore Freight Advance

The request of the Baltimore & Ohio Railroad for a flat advance of 22 cents a ton on iron ore from the lower Lake ports to Valley furnaces in addition to the proposed general freight increase, is unfavorably regarded by pig iron makers. The present charge is 65 cents a ton, which would be increased to 87 cents by the 22-cent advance and still higher by the general increase. It is estimated the advances would add about 48 cents a ton to the freight charge from the Lakes to the Mahoning Valley, or about \$1 to the cost of iron per ton. While iron ore producers and consumers favor an equitable advance, they believe the proposed charge is excessive and are prepared to oppose it. Increases in the price of ore and the carrying charges as now proposed would add approximately \$3 per ton to the cost of pig iron and would effectually block any price decline.

Pere Marquette's Expansion Plans

DETROIT, June 14.—According to Frank H. Alfred, president of the Pere Marquette Railroad, the company's \$21,000,000 expansion program will be carried out as follows:

Of the total appropriation, \$14,000,000 will be devoted to the purchase of new equipment, including 55 steel passenger cars, 20 passenger locomotives, several hundred freight cars and a number of freight engines of various types. The remaining \$7,000,000 will be used for property improvements, including a new car shop at Grand Rapids, Mich.; complete new engine terminals at Saginaw and Plymouth, Mich., and a yard at New Buffalo.

Whether or not the program is carried out this year, Mr. Alfred said, depends on whether the Government allows the railroads the 30 per cent rate increase which has been asked. Such an increase would add \$9,000,000 to the annual earnings of the Pere Marquette and enable the road immediately to issue bonds to cover the cost of the improvements. The Pere Marquette program calls for the gradual replacement of all its wooden passenger cars with steel cars.

Southern Metal Trades Association

ATLANTA, GA., June 16.—The third annual convention of the Southern Metal Trades Association will begin here to-day at the Piedmont Hotel, with 200 delegates from 10 States in attendance. Atlanta was host to the association on the occasion of its first convention, which was in 1913. The 1919 conclave went to New Orleans, where the members of the organization voted unanimously to return to Atlanta in 1920.

W. E. Dunn, Jr., secretary of the association, has expressed the opinion that this will be the most important meeting in the association's history, due to the rapidly changing industrial conditions, and to the direct bearing these changes will have on the metal trades industry.

William T. Harding, Raleigh, N. C., is president of the association; J. M. Hollowell, Atlanta, vice-president, and A. J. Merrill, Atlanta, treasurer.

Home Owning Plan of Corporation is Popular

Many Employees Express Desire to Acquire Property—Details of Three Methods Have Been Carefully Worked Out—Easy Terms of Payment

EMployees of the United States Steel Corporation are showing the liveliest interest in the new "Home Owning Plan" which has been promulgated, and officers of subsidiary companies are receiving large numbers of applications from men who are anxious to own their own homes. The plan has been worked out with great care and promises to develop into a departure of much importance.

While the subsidiary companies have, for a number of years, constructed houses and sold them to their employees on easy payment terms, a plan has recently been developed by the corporation as a guide for the subsidiary companies in establishing home owning plans for the employees. These regulations cover the sale of houses owned by the company to employees; the purchase of houses from private owners for re-sale to employees and the building of houses for employees either by the company or by a contractor approved by the company.

The "Home Owning Plan" is divided into three possible methods of application, which are contingent on the financial ability of the purchaser and the fact that the house is already built or is one to be built.

Details of the three plans are as follows:

Home-Owning Plan

There is presented herewith the outline of general regulations to be used by the subsidiary companies of the United States Steel Corporation as a guide in establishing home owning plans for their employees. This outline is made as general as possible, it being fully recognized that each company's details must be devised to meet special and local conditions.

These regulations cover the sale of houses owned by the company to employees; the purchase of houses from private owners for resale to employees, and the building of houses for employees either by the company or by a contractor approved by the company. The method of carrying out the plan is explained in general and the financial requirements in detail.

The home owning plan naturally divides itself into three possible methods of application contingent on the financial ability of the purchaser and the fact that the house is already built or is one to be built.

A—Installment Payment Plan for an Existing Dwelling

This plan applies only to an existing dwelling owned by the company or bought by the company from a private owner for an employee. The dwelling will be sold to employee under a contract providing for an initial payment of not less than 10 per cent of the purchase price; the balance of the purchase price to be paid in monthly installments extending over a period not exceeding 10 to 15 years, with interest on deferred payments at the rate of 5 per cent per annum. The purchaser may anticipate payments at any time and is offered special inducements for early completion of contract. The title to the property remains in the company until the completion of the contract. If, at any time, he desires to withdraw from the contract he is permitted to do so and receive back all money he has paid in on principal and interest thereon, plus 5 per cent interest thereon less a rental which is based on 8 per cent per annum of the purchase price for the period of possession.

B—Installment Payment Plan for Building a Dwelling

Under this plan the company will build the dwelling for employee, title being taken in the name of the company. The company will furnish free plans and specifications and supervise the construction of the house. The dwelling will be sold to the employee under the same plan as outlined under "A."

C—Mortgage Plan

This plan will best apply where purchaser is able to make a large initial payment and desires to have the title to the property in his own name. A loan not exceeding 75 per cent of the cost of the property will be made to the employee, secured by a first mortgage bearing interest at 5 per cent per annum. The loan may be repaid in installments. This plan may apply to sales of existing dwellings

as well as to houses to be built, and is upon substantially the same lines as a plan already in operation at Gary.

Installment Payment Plan for an Existing Dwelling

If an employee desires to purchase an existing dwelling owned by the company, or desires the company to purchase for him an existing dwelling from a private owner, the transaction may be accomplished as follows:

1—Dwelling Owned by the Company

The company will agree to sell said dwelling to the employee upon condition that he make an initial payment of not less than 10 per cent of the total cost, with monthly installments thereafter over a maximum period of from 10 to 15 years. Interest will be charged upon deferred payments at the rate of 5 per cent per annum, and the title will remain in the company until the terms of the contract are fulfilled.

2—Dwelling to Be Acquired from a Private Owner

If, after thorough inspection and investigation of values, the company approves the purchase, it will take steps to acquire possession of the property, and after acquiring it, will sell the dwelling to the employee upon the terms and conditions outlined above for the sale of an existing dwelling owned by the company.

Application

Where land companies are under separate management, application for the purchase of a dwelling must have the favorable recommendation of the employing company. Each company should prepare applications, contract, etc., in proper form to meet its special conditions as well as the general conditions hereinbefore outlined. The form of application should require the statement of facts regarding the transaction in sufficient detail to enable the company intelligently to pass upon applications.

Location

The company must approve the location of any dwelling to be built or acquired under this plan.

Note—In passing upon locations for dwellings the following facts should be borne in mind:

1. The dwelling will be occupied by employee and must be convenient to his place of work.
2. The dwelling should be located in a good residence section where adequate provision is made for the welfare of the occupant.

Inspection and Appraisal

Before purchasing any property for resale to an employee, the company will ascertain, by inspection and appraisal, that the property is well located and is a good investment, and that the dwelling is modern, well constructed, in good repair and suited to the needs of the employee.

Valuation

In the purchase and sale of all properties, the company's estimate of values should be employed as the basis of contracts.

Note—The company must be prepared at all times to demonstrate to the purchaser the methods by which values have been determined.

Alterations and Additions

Reasonable alterations or additions may be made by the company for the employee at the time the agreement is entered into and the cost added to the contract price; but no further alterations or additions shall be made by the purchaser during the purchase period without the written consent of the company.

Use of Property During Purchase Period

Purchaser should not be allowed, during the purchase period, to rent or use the property for any other purpose than as a dwelling for himself and family, without the written consent of the company.

Note 1—This regulation shall not be construed as forbidding him to let rooms to lodgers for whom he can make a suitable provision.

2—The company shall provide in the contract for restrictions upon the property in conformity with



Carnegie Steel Co.'s
6-room houses for em-
ployees of by-product
coke plant at Clairton,
Pa.



Six - room house,
Tennessee Coal,
Iron & R. R. Co.,
Fairfield, Ala.



Standard double four-room house,
Tennessee company, Fairfield, Ala.

Types of Houses Which Will Be Built for Employees by the U. S. Steel Corporation Under Its New Home Owning Plan



For employees of by-
product coke plant at
Clairton, Pa. (Carne-
gie Steel Co.)



Three - room double
house, American Steel
& Wire Co., Fairfield,
Ala.



Carnegie Steel Co.'s 5, 6 and 7-
room houses, at McDonald
plant



Standard 5-room house, Ten-
nessee Coal, Iron & R. R. Co.,
Fairfield, Ala.

Carnegie Steel Co.'s houses at
by-product coke plant, Clairton,
Pa.

the requirements of the residence section in which the dwelling is located.

3—The purchaser shall not leave the property unoccupied for so long a time as to cause injury to the building or to jeopardize the fire insurance protection.

Fire Insurance

Fire insurance should be taken out by the company in an amount as nearly equal to the insurable value of the dwelling and improvements as can be obtained.

Note—In developing the fire insurance clause in the contract, it should be kept in mind that in case of total or partial fire loss on the completed building, a settlement should be possible to be arrived at between the parties to the contract as their interests may appear, particularly in respect to the relative desirability of canceling the contract or restoring the building at a possible increase over the original cost.

Title

Where dwellings owned or acquired by the company are sold to employees, title to the property shall be vested in the company until payment by employee is made in full, when the title will be transferred to him.

Payments

Not less than 10 per cent of the employee's gross investment under this plan should be paid upon execution of the contract with the company, the balance to be paid in monthly installments within a maximum period of from 10 to 15 years, with interest on deferred payments at the rate of 5 per cent per annum, the interest period to commence with the date of occupancy.

As an inducement to the employee to complete his payments as soon as possible, the company, upon final payment, will make allowances or credits as follows:

If contract is completed within	Credit per \$1,000 of contract
Two years from date of first regular scheduled payment.	\$50
Three years from date of first regular scheduled payment.	45
Four years from date of first regular scheduled payment.	40
Five years from date of first regular scheduled payment.	35
Six years from date of first regular scheduled payment.	30
Seven years from date of first regular scheduled payment.	25
Eight years from date of first regular scheduled payment.	15

Note—The employee should be shown the advantage to him of making his initial payment, as well as periodical payments, as large as possible.

Periodical payments must be made at least monthly.

Additional payments may be made at any time and in any amount over and above the regular scheduled payments. The regular scheduled payments will commence when the house is ready for occupancy and continue until the termination of the contract.

Note—It is recommended that contract with employee may contain a clause authorizing deduction from his pay envelope; the details of this recommendation to be left to the judgment of the company.

Taxes, special assessments, fire insurance premiums, etc., will be paid by the company, when due, and charged to the purchaser in addition to his next monthly payment; but if the purchaser so requests, this additional amount may be pro-rated over any desired period, not to exceed 12 months, interest being charged on such deferred payments at the rate of 5 per cent per annum.

Suspended Payments

In case of temporary reduction of earnings by reason of illness, disability or unavoidable temporary suspension from work, the company will provide, if and when the purchaser so requests, for a reasonable extension of time for payment.

Repairs During Purchase Period

Purchaser must keep the property in good condition and make all necessary repairs during the term of the contract; and in case of his failure to do so, the company shall have the right, following written notice of intention to do so, to perform necessary repairs and maintenance, adding the cost thereof to the purchaser's next monthly payment. Access to the property for purposes of inspection should be afforded the company at all reasonable times.

Assignment of Contract

The contract shall provide that it shall not be assignable by the employee without the written consent of the company.

Withdrawal Privilege

The contract may be terminated by the purchaser upon 30 days written notice to the company to the effect that he does not wish to continue the contract. In case of the termination of a contract the company will return to the purchaser all money paid by him on principal of the contract, and interest thereon, plus simple interest thereon

at 5 per cent per annum from which shall be deducted a rental charge of 8 per cent per annum of the total contract price for the period during which he had possession of the dwelling.

Default

In case the purchaser shall be in default with respect to any of the terms or conditions of the contract, then the company shall have the right to terminate the contract if said default be continued after 30 days written notice to the purchaser, and in the event of termination of the contract, the company will return to the purchaser all money paid by him on principal of the contract, and interest thereon, plus simple interest thereon at 5 per cent per annum, from which shall be deducted a rental charge of 8 per cent per annum of the total contract price, for the period during which he has possession of the dwelling.

Note—In carrying out the two foregoing paragraphs, the contract should contain provisions fully protecting the interests of the company.

Installment Payment Plan for Building a Dwelling

Where an employee desires the company to construct for him a dwelling on property which he owns, or which the company may acquire for him, the transaction may be accomplished as follows:

The company will advise the employee in the selection of a proper location, and furnish complete building plans to meet his needs, will assume responsibility for the proper construction of the dwelling at a minimum cost, and will agree to sell the property to him on the following terms: A minimum initial payment of 10 per cent of the total cost of the property, and the payment of the balance in monthly installments within a maximum period of from 10 to 15 years; interest on deferred payments at the rate of 5 per cent per annum, and title to remain in the company until the conditions of the contract are fulfilled.

Application—Same as under plan A.

Location—Same as plan A.

Plans and Specifications

The company will have on file plans and specifications for dwellings of various sizes and types from which the employees may select a suitable design. The plans will be supplied free of charge including the making of minor changes.

All other plans and specifications for a dwelling to be built must be subject to the approval of the company before execution of contract between company and employee and before work of construction is started.

Construction

Dwelling and improvement must be constructed in conformity with approved plans, specifications and pre-determined cost. The construction must be subject to the inspection and control of the company.

Note—The purchaser should satisfy himself by visits to the property that construction is proceeding according to the plans and specifications. Should he desire changes or additions to be made during construction, this privilege should be granted him wherever possible, but only upon the written consent of the company, and consent must contain an estimate by the company of the cost of the desired changes or addition, payment of which must be adequately secured.

Valuation—Same as plan A.

Alterations and Additions—Same as plan A.

Use of Property During Purchase Period—Same as plan A.

Fire Insurance

Upon completion of the house, fire insurance should be taken out by the company in an amount as nearly equal to the insurable value of the dwelling and improvements as can be obtained.

Note—*Same as under this clause in plan A.*

Title

Title to the property should be vested in the company until payment by employee is made in full, after which title will be transferred to him.

Where a dwelling is built by the company on a lot owned by the employee, title to said lot shall be conveyed to and remain in the company until payment of his indebtedness is made in full by the employee. In such case, however, the fair value of the lot, as determined by the company and agreed upon in the contract, shall be credited to the employee as his initial payment, or a portion thereof.

Payment

Not less than 10 per cent of the employee's gross investment under this plan should be paid upon execution of the contract with the company, the balance to be paid in monthly installments within a maximum period of from 10 to 15 years, with interest on deferred payments at the rate of 5

per cent per annum; the interest period to commence with the date of occupancy.

As an inducement to the employee to complete his payments as soon as possible the company, upon final payment, will make allowances or credits as follows: Same as under plan A.

Notes same as plan A.

Suspended Payments—Same as plan A.

Repairs During Purchase Period—Same as plan A.

Assignment of Contract—Same as plan A.

Withdrawal Privilege—Same as plan A except that should this withdrawal privilege be exercised before he occupies the house and makes the first scheduled payment, then he shall forfeit to the company 10 per cent of the contract price, the balance of his initial payment, if any, being returned to him.

Default—Same as plan A.

Mortgage Plan

Under this plan the company will loan an employee money with which to purchase a dwelling house already built and owned either by the company or privately, or to employ a contractor approved by the company to build a dwelling house; the title to the property to be transferred to and vested in the purchaser.

Amount of Mortgage

The amount of the loan shall in no case exceed 75 per cent of the value of the property and proposed improvements. The loan shall be secured by a first mortgage on the property, bearing interest at the rate of 5 per cent per annum without commission.

Terms of Payment

Re-payment of such loan should conform to the local practice of the community where the property is situated provided that the term of such mortgage shall in no case exceed a period of 10 years. It is suggested that the mortgage provide for periodical payments, preferably each month, including interest, with the privilege of anticipating payments at any time.

Federated Engineering Societies

A general organization of the American engineering societies of the country was effected in Washington at a meeting held on June 3 and 4 by the representatives of 61 national, local and regional engineering and technical societies. The new organization has been given the name Federated American Engineering Societies and its object is "to further the interests of the public through the use of technical knowledge and engineering experience and to consider and act upon matters common to the engineering and allied technical professions."

The meeting appeared to be the result of a growing belief that professionally the engineers have not been making the impression which they should upon developments in the country and that they could collectively do much to swing public sentiment along right channels, at least more quickly than has been the case in the matter of projects involving engineering. The movement is partly an outgrowth of the work of so-called reorganization, development or introspection committees appointed sometime ago by the leading national engineering societies to investigate the possibility that there should be a re-statement of the aims of the several organizations. One step in the movement was the establishment of a joint conference committee of the four main societies of civil, mining, mechanical and electrical engineers, and the Washington meeting was called by this joint conference committee.

The meeting drew up a constitution and by-laws, and another meeting is to be held in the early fall definitely to inaugurate the special but broad activities of the organization. Meanwhile the existing Engineering Council at 29 West Thirty-ninth Street, New York, promised through several representatives present to further the objects in the interim of the federated societies.

The new organization is thus an association of associations, and its affairs will be conducted by representatives elected or appointed by the constituent member societies. Representation will be in part according to the numerical strength of the member societies, and funds will be supplied in the same way, probably \$1.50 per capita of society membership.

Application—Same as plan A.

Location—Same as plan A.

Inspection and Appraisal—Same as plan A.

Valuation—Same as plan A.

Plans and Specifications

All plans and specifications for a dwelling to be built must be subject to the approval of the company before execution of contract between company and employee and before work of construction is started.

Construction

Dwelling and improvement must be constructed in conformity with approved plans, specifications and pre-determined cost. The construction must be subject to the inspection and control of the company.

Note—The purchaser should satisfy himself by visits to the property that construction is proceeding according to the plans and specifications. Should he desire changes or additions to be made during construction, this privilege should be granted him wherever possible, but only upon the written consent of the company, and consent must contain an estimate by the company of the cost of the desired changes or additions, payment of which must be adequately secured.

Alterations and Additions

No changes, alterations or additions to property should be made during mortgage period without the written consent of the company.

Use of Property During Purchase Period—Same as plan A.

Fire Insurance

Fire insurance shall be taken out by the employee in an amount as nearly equal to the insurable value of the improvements as can be obtained. These policies should have the approval of and be filed with the company.

Suspended Payments—Same as plan A.

The sessions were held in the Cosmos Club in the daytime and the evening sessions at the New Willard Hotel, and an elaborate program of highly inspirational character was followed substantially as prepared in advance. About 123 engineers attended, many of them particularly prominent in the profession. Calvert Townley, Westinghouse Electric & Mfg. Co., New York, was chosen chairman, and J. C. Hoyt, U. S. Geological Survey, was elected secretary.

Electric Alloy Steel Co. Plans

Production was scheduled to commence this week at the Charleroi, Pa., plant of the Electric Alloy Steel Co., Youngstown, Ohio, purchased from the Universal Steel Co., Cleveland. Output will consist of special analysis steel and will be at the rate of 25 tons a day at the start. It is planned to double the production by Aug. 1, the normal annual output to be about 15,000 tons. The product is sold for 60 days ahead with plenty of business in sight. The management, however, is pursuing a conservative sales policy. Need for special analysis steel is reported to be heavy, especially from the automotive industry, some makers of motor vehicles having virtually exhausted their stocks.

The company has acquired a 150-acre site with river and railroad frontage at Niles, Trumbull County, where it expects to begin construction of a plant within the next year, the time depending wholly upon costs of building.

Exports of Machinery and Tin Plate

WASHINGTON, June 14.—England is still the chief purchaser of American metal-working machinery. Out of a total exportation of these machines of \$3,613,721, in April, 1920, \$1,027,559 went to England. France was second with \$780,136; Canada third with \$473,504, and Japan fourth with \$358,241.

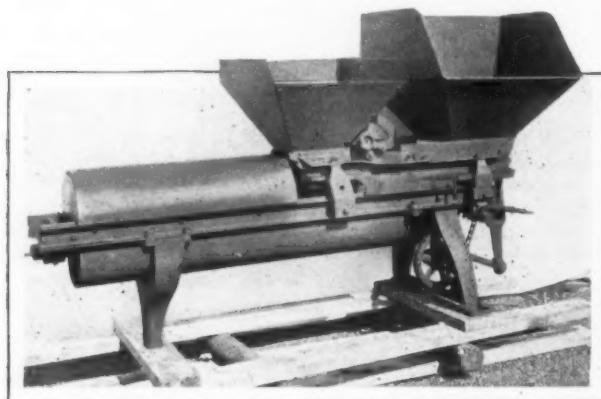
In our exportation of tin plate, terne plate and tapers tin, Japan led all of our customers. Her receipts during April, 1920, were 18,635,111 lb., valued at \$1,453,943, out of a total export of these commodities of 51,650,920 lb., worth \$3,892,017. Canada was next with 9,113,504 lb., worth \$653,789, and Brazil third, with 5,736,566 lb., worth \$424,551. Then came China with 2,807,419 lb. at \$218,938, and England fifth, with 2,085,994 lb. at \$184,545.

Carburizing Compound Mixer

A machine for mixing bone meal and the various compounds used for pack hardening and carburizing steel is now being manufactured by the Kent Machine Co., Kent, Ohio. After each heat it is customary to replenish the used compound with a certain amount of new, usually about 25 per cent, which, to insure a uniform depth of penetration, should be thoroughly mixed with the old. It is explained that the machine is adapted to this specific work. The operation of the mixer is continuous and it automatically proportions, feeds, mixes and discharges the mixed material without requiring any man labor beyond the loading operation.

A large hopper holds the used material and a smaller hopper the new bone meal or compound that is to be mixed with it. On the throat of the small hopper there is a gage or gate which can be adjusted to restrict the opening through which the material is carried by the reciprocating action of the feed plate. This adjustment makes it possible to obtain any proportion of the new and used material desired.

The material in the hoppers rests upon the feed plate, and at each forward stroke a layer of the compound or bone meal is carried into the throat, the



Machine for Mixing Bone Meal and the Various Compounds Used for Pack Hardening and Carburizing Steel

material in the hopper settling down as the plate moves forward. During the backward motion of the plate this layer, which cannot be carried back into the hopper on account of the material behind it, is dropped off the edge of the plate into the mixing trough.

Both new and old materials drop into the mixing trough at approximately the same place. The mixing is done by a long horizontal shaft on which there is a series of specially designed paddles or blades which mix the materials and at the same time convey them toward the discharge end of the trough. Careful experiments were made to determine the length of time required to obtain a thorough and uniform mix, and the mixing shaft, it is explained, is so designed that it is impossible for the material to be discharged from the trough before complete and thorough mixing has taken place. The mixing trough is provided with a cover, thus to prevent the excessive amount of dust which is usually found where bone meal or compound is being mixed.

A particular feature of the machine which will appeal to those who are operating plants where large quantities of bone meal or compound is used is the possibility of building large bins over the present hoppers. These can be used as storage bins and it is not necessary to mix more material than can be used in any particular heat. In some plants these bins are carried up to the floor above and the material is dumped into them through a trap door, while in others a small belt conveyor or bucket elevator is used to elevate the material into the bins.

The Fuller company will supply a powdered coal equipment for W. B. Uihlein, Milwaukee, for a new power house, the first unit of which will be composed of four 500-hp. Wickes boilers, with horizontal induction type burners.

National Research Council Officers

The National Research Council, a co-operative organization of leading scientific and technical men of the country for the promotion of scientific research and the application and dissemination of scientific knowledge for the benefit of the national welfare, has elected the following officers for the year beginning July 1: Chairman, H. A. Bumstead, professor of physics and director of the Sloane physical laboratory, Yale University; first vice-chairman, C. D. Walcott, president of the National Academy of Sciences and secretary of the Smithsonian Institution; second vice-chairman, Gano Dunn, president the J. G. White Engineering Corporation, New York; third vice-chairman, R. A. Millikan, professor of physics, University of Chicago; permanent secretary, Vernon Kellogg, professor of biology, Stanford University; treasurer, F. L. Ransome, treasurer of the National Academy of Sciences.

The council was organized in 1916 under the auspices of the National Academy of Sciences to mobilize the scientific resources of America for work on war problems, and reorganized in 1918 by an executive order of the President on a permanent peace-time basis. Although co-operating with various Government scientific bureaus, it is not controlled or supported by the Government. It has recently received an endowment of \$5,000,000 from the Carnegie Corporation, part of which is to be expended for the erection of a suitable building in Washington for the joint use of the council and the National Academy of Sciences. Other gifts have been made to it for the carrying out of specific scientific researches under its direction.

Mining Engineers on Lake Superior

The Lake Superior meeting of the American Institute of Mining and Metallurgical Engineers begins on Monday, Aug. 23, and with the various scheduled trips will take up the entire week. Houghton, Mich., is to be the starting point. An automobile trip will be taken through the Houghton district on Monday. On Tuesday there will be a visit to the copper mines underground, sightseeing and historical trip to Keweenaw and an inspection of leaching, dredging, flotation, smelting and electrolytic refining plants. The party will leave Tuesday evening by two special trains, one of which will go to Ishpeming and the other to Vulcan, Mich. From Ishpeming a trip will be made to a charcoal blast furnace and the connected by-product plant. The party going to Vulcan will visit iron mines, and both trains will go to Iron Mountain for a technical session in the evening. Minneapolis will be visited on Thursday, Aug. 26. Thursday night the travel will be continued to the Mesabi Range and on Friday mines at Babbitt, Virginia, Mountain Iron and Hibbing will be visited. At Hibbing there will be a business and social session, and the party will arrive at Coleraine early Saturday to inspect the largest iron ore washing plant in the world. Duluth will be reached early Saturday afternoon, and a visit will be made to the Minnesota Steel Co. plant and its model village, which has elicited favorable comment.

Inspection of Motor Trucks

Systematic inspection of motor trucks is advocated by motor truck makers. An operator of a fleet of nearly 800 trucks recently declared, according to the Pierce-Arrow Mfg. Co., Buffalo, that inspection actually decreased operating expenses by 20 per cent. "A thorough inspection requires at least two hours' time. The inspector should check a printed form report, noting after actual test the condition of the various parts of the motor, governor, radiator, carburetor, ignition system, clutch, grease cups, transmission, steering mechanism, rear axle, chassis, body, cab, brakes, etc. This monthly report tells the truck owner or fleet manager whether the driver is competent, whether the truck is overloaded or otherwise abused. It gives him a check upon his repair service, showing whether it is up to standard, and is insured against possible breakdowns or troubles."

Welfare Work Is Curtailed at Youngstown

Employee Representation and Safety Measures Not Affected—Service of Some Kinds Not Desired and Found to Be a Waste of Time and Effort

YOUNGSTOWN, OHIO, June 14.—Feeling that employees do not desire such assistance and do not appreciate it, and that the returns are therefore disproportionate to the expense, the Youngstown Sheet & Tube Co. has largely curtailed its welfare department, and wholly abandoned some activities. The plan of employee representation, whereby the workers have a voice in the conditions under which they work, will be retained. The success of this arrangement, incidentally, was partially responsible for the decision to reduce the scope of the industrial relations department.

The Youngstown Sheet & Tube Co. has been one of the leaders in welfare work in the country. The department was first developed on a large scale about five years ago by Dudley R. Kennedy, who has been for the past year and a half counsellor on labor, employment and industrial relations problems, with headquarters at Philadelphia. Mr. Kennedy left the Sheet & Tube company to take charge of similar work for the American International Shipbuilding Co. at the time it was operating extensively at Hog Island, below Philadelphia. He was succeeded by Roy M. Welsh, who had been in close touch with the work. The department head was given and still retains the title of assistant to the president in charge of industrial relations.

It is announced that legal aid, schools for foreign-born workers and nurse visiting have been altogether abandoned. The company will continue, for the present at least, its program of house building, dwellings to be sold or rented to its workers. Already several million dollars have been expended in this work on sites near its East Youngstown plant and its coal mines at Nemacolin, Pa., where model settlements have been developed.

Americanization Schools

Its Americanization schools for employees of foreign birth were under the direction of George B. Fout and the classes were directed by a corps of 30 teachers. This activity was always conducted, however, in face of discouragements, as the foreigners, for the most part, are employed long hours in the mills and have comparatively little time for such schools. As a consequence, the attendance, which at the forepart of the year was encouraging, dwindled toward the close of the sessions.

In ministering to the sick, needy and ignorant among its employees and their families, the company performed a distinct public service. Nurses visited homes of the workers, concentrating on the foreign-born, cared for the sick and instructed ignorant mothers in the fundamentals of hygiene, sanitation and proper methods of living. Likewise young girls were taught the rudiments of sewing and domestic science.

During the influenza epidemic last year, the company spent thousands of dollars in its combative work, for which not a cent was charged. Temporary hospitals were established by the company, in charge of physicians and skilled nurses. In many cases the victims were treated in their homes and often the company sent warm food to homes where the able-bodied were stricken. As a preventive measure, the company offered all its workers the opportunity of a serum injection without charge. The number of those who contracted the disease, after submitting to this treatment, in comparison with those who became infected without taking this precaution, was very small.

Fighting Trachoma

A number of years ago it was discovered that large numbers of foreigners were afflicted with trachoma, a contagious disease of the eye which frequently produces blindness. Co-operating with the Government, the com-

pany took exhaustive steps to stamp out this malady, with highly successful results. Clinics were established and doctors with a special knowledge of the subject were employed. All employees were examined, a hospital established where cases were isolated and patients were given special treatment.

The legal aid department operated on an enlarged basis and handled many confidential matters for workers, without remuneration. In protecting the weak and ignorant, principally among the foreigners, from the sharks who preyed upon them, this department proved especially valuable. Early in the war, arrangements were made with the Government to have employees enlist at the plant. Men were assisted in filling out their questionnaires under the selective service act and notary service was given without charge. The department also handled many private matters between soldiers and their families. Four thousand letters were handled for employees, principally Austrians and Hungarians, during the war when the mails were closed to the belligerents in Central Europe. Transmission of these letters was effected through the Red Cross. Where necessary, the company translated letters for its workers.

Do Not Want Assistance

Officials have come to the conclusion, however, that many of the workers, perhaps the majority, do not want such assistance and are ungrateful for it. Minds of many of the ignorant have been poisoned by propagandists and agitators with pronounced Bolshevik proclivities. As a consequence foreign families were often distrustful of such services on the part of the company and those engaged in such work often met with rebuffs. The workers preferred to act for themselves in such matters, it was contended, and to have the cost of such service added to their wages. It is evident, however, that such work could be carried on by the company, for groups, at a minimum of expense, though it entailed a large outlay each year.

If this sum were divided, however, among the 12,500 employees of the company each pay day, the increase they would receive would be wholly disproportionate to the value of the service.

It is emphasized that safety work will not be abated in the least, but, on the contrary, will be advanced. Furthermore, it is pointed out that some of the functions which have been abandoned will be discharged by the community, perhaps not as efficiently, and those who take advantage of such opportunities may do so without feeling that the company has any interest involved. Certainly, in such case, the suspicion of an ulterior motive cannot be attached to the work.

President James A. Campbell and directors of the company are well pleased with the results accomplished by employee representation and steps will be taken to enhance the influence and benefits of this arrangement as opportunity affords.

In short, the Sheet & Tube company has come to the conclusion that some phases of welfare work are a waste of time and effort, that they serve to antagonize men in many cases rather than to make them more friendly, and that it is the part of wisdom to curtail an expenditure which is not producing desirable results.

Molders of all York, Pa., iron and steel plants have gone on a strike because employers have refused to grant their demands for an increased wage scale, and the iron and steel industry in that city is practically at a standstill. Mayor E. S. Hugentugler of York has caused the erection of a number of "strike fences" to aid in the protection of life and property in the city from violence.

DANGERS OF UNIONISM

Tributes to Judge Gary and Governor Coolidge at Meeting of New England Foundrymen

In speaking of the dangers of unionism as practiced to-day and the seriousness of the hour for business and national life, Thomas J. Kelley, manager, Manufacturers' Association of Hartford County, at a joint meeting of the New England Foundrymen's and the Connecticut Foundrymen's Association, at Hotel Garde, Hartford, Conn., on the evening of June 9, said that Governor Coolidge of Massachusetts and Judge Gary, United States Steel Corporation, had accomplished more toward stopping the stampede of "mis-unionism" in this country than all other Americans combined.

"Governor Coolidge," he said, "saved the sovereignty of the State, while Judge Gary saved the open shop for America. Everybody owes a debt of gratitude to this man and ought to be doing something to perpetuate the part he has played in our industrial life."

Continuing, he said in part: "The average working man, if let alone, will not join a union except when confronted with the question of which is the stronger, the boss or the union," and Mr. Kelley believes that it is up to management to impress on its working forces that it is not necessary for them to go over to the union side. He also believes the working man should be taught there is a job for him when he is ready for it, and that it is not to be put on the auction block by any walking delegate, and that following agitators is a losing game. He is not opposed to men organizing, but he is opposed to autocratic labor leadership.

He took exception to many of the remedies for industrial unrest. Profit-sharing, he declared, was a fail-

ure because it taught profit-sharing without teaching profit-saving. In other words, the plan raises a false standard. Collective bargaining he branded as a conspiracy between capital and labor against the public, that it was not a square deal to the public, and when the public fully realized the situation, capital and labor would be made aware of the fact.

Federal tribunals are uneconomic, Mr. Kelley said, because they are empowered to fix wages by raising them, but not empowered to make men earn what they are paid. Declaring that the industrial toboggan is moving, he said that the fellow who has conducted an open shop will have a tremendous advantage, when the carnival of competition sets in, over the employer who is bound hand and foot by unions and has turned his shop over to the walking delegate.

Reports, Government and others, show a rush of the open-shop movement all over the country, said Mr. Kelley, and if the business man of New England will do his little bit, the walking delegate will not have a chance. "Your business, your city or town and your State can be made just as peaceful as you want to make them."

Frederick W. Stickle, Capital Foundry Co., Hartford, and president, Connecticut Foundrymen's Association, presided. He expressed the hope that the New England Foundrymen's Association will become a working and not the social association he has found it to be. He suggested that the three important New England states, Connecticut, Rhode Island and Massachusetts, each have a separate working association that can be affiliated with the New England organization.

The New England Foundrymen's Association was officially represented by Frederick Lovell, vice-president, Walker-Pratt Mfg. Co., Watertown, Mass. Approximately 100 attended the meeting.

Corporation Attitude Approved

WASHINGTON, June 15.—In a statement of principles of industrial relations a committee of the Chamber of Commerce of the United States has in effect approved the attitude of the United States Steel Corporation in refusing to deal with the steel strikers' committee.

The paragraph which bears on the steel strike situation, although not specifically mentioning it, is as follows:

"When, in the establishment or adjustment of employment relations, the employer and his employees do not deal individually but by mutual consent, such dealing is conducted by either party through representatives and it is proper for the other party to ask that these representatives shall not be chosen or controlled by, or in such dealing in any degree represent, any outside group or interest in the questions at issue."

The principles of industrial relations have been drawn up by a committee composed of members of the board of directors of the Chamber of Commerce. It was appointed after the close of the President's first industrial conference to consider the principles which were a matter of controversy in that gathering. The report of the committee has been sent out to a referendum of the 1300 industrial and commercial organizations comprising the membership of the chamber.

Break in San Francisco Strike

SAN FRANCISCO, June 10.—The San Francisco union machinists who have been on strike since Oct 1, last, have voted nearly 4 to 1 to return to work. Conditions of the return include retention of the old wage scale of \$6.40 a day, with a graduated increase beginning the first of next month. The Oakland union later voted to remain on strike and is trying to get the San Francisco union to rescind its action, but so far without success. On June 6, by practically a unanimous vote, the four locals of union boilermakers on both sides of the bay decided to continue the strike. The ship carpenters have also voted to return to work. So the situation in labor circles stands that, while the strike

has not been declared off in all lines, there is a break in the solidarity of the strike forces, which will greatly help the local shipyards and shops.

The Foundrymen's Association, which some months ago granted the demands of the union, have recently agreed to an advance in wages to what is practically an \$8 basis, and the foundries not in the association will have to follow this scale to avoid further trouble.

In the World of Labor

The Brown & Sharpe Mfg. Co., Providence, R. I., has opened a dormitory for apprentices at 58 Park St. J. Edward Goss, supervisor of apprentices, is the originator of the idea, which is believed to be a unique one. Twenty-seven boys can be accommodated, some of the rooms containing two and three cots. Many modern improvements have been installed for the comfort of the boys. No meals are served in the building, but these may be obtained in the immediate vicinity.

The Wickwire-Spencer Steel Corporation, Spencer, Mass., has provided four cash prizes for the best looking yards in Wire Village.

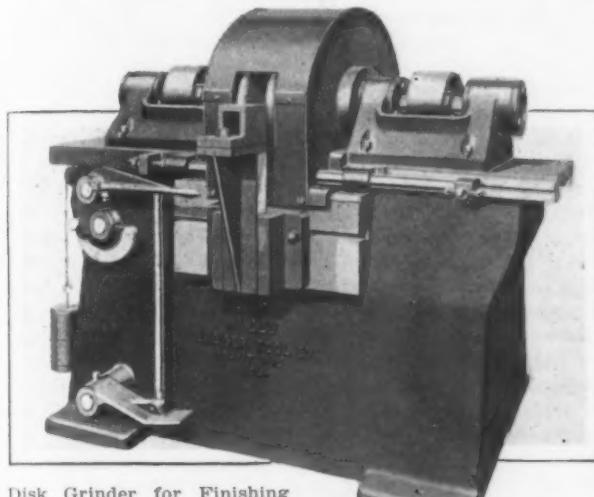
Labor conditions in Cleveland continue to show improvement. Common labor has been more plentiful for several weeks and now employment departments of manufacturing plants are receiving many applications for work from men seeking various classes of machine work. However, the quality of the applicants does not generally appear to be very high. Many manufacturers report that the change in the labor situation has resulted in a very noticeable improvement in the work of their employees, this being indicated by an increase in the output.

The union jobbing foundries in Chicago, which were recently tied up by a molders' strike which ended favorably to the employers, are now confronted with a helpers' strike, called on June 10. The men ask for an eight-hour day, time and one-half for overtime, and an unspecified advance in wages. There are about 30 foundries affected and probably 1000 men are out. The organization which called the strike was only a day old when it took that action. The helpers have been receiving from 50c. to 70c. an hour.

Double Spindle Disk Grinder

A double-spindle type disk grinder, known as No. 220, is announced by the Badger Tool Co., Beloit, Wis. The machine is intended for finishing the two opposite parallel faces of work within its scope, such as drop forged wrenches, piston rings, nuts, etc.

Abrasives cylinders held in chucks are interchangeable with the disk wheels, making it possible with extra equipment furnished to use water or grinding compound. The grinder is designed to carry two 20-in. disk wheels or two 16-in. abrasive cylinders. The spindles are 2 3/16 in. in diameter and are mounted in both radial and thrust ball bearings. The spindle pulleys are 8 1/2 in. in diameter by 6 in. face. The ways on



Disk Grinder for Finishing the Two Opposite Parallel Faces of Drop Forged Wrenches, Piston Rings, Nuts, etc.

the base are 10 in. wide by 20 in. long, and the bottom of the sliding head is 10 in. wide by 25 in. long.

Features emphasized are the provision for excluding dust and grit from the sliding ways, the positive micrometer stop screw and the rigid construction of the work supports.

The machine is made for both belt and direct motor drive. The height of the spindle from the floor is 38 in., the extreme overall length 70 in., and weight of the entire equipment 4700 lb.

Large Increase in Steel Corporation's Orders

Unfilled orders on the books of the United States Steel Corporation, May 31, were 10,940,465 tons, compared with 10,359,747 tons on April 30. This is an increase of 580,718 tons, against one of 467,672 tons in April, 389,994 tons in March, 216,640 tons in February, and 1,020,075 tons in January. It is the thirteenth consecutive monthly increase shown by the corporation. The unfilled tonnage a year ago was 4,282,310 tons, or 6,658,155 tons less. The table below gives the unfilled tonnage at the close of each month beginning with January, 1917.

	1920	1919	1918	1917
Jan. 31.....	9,285,441	6,684,268	9,477,853	11,474,054
Feb. 28.....	9,502,081	6,010,787	9,288,453	11,576,697
March 31.....	9,892,075	5,430,572	9,056,404	11,711,644
April 30.....	10,359,747	4,800,685	8,741,582	12,183,083
May 31.....	10,940,465	4,282,310	8,337,623	11,886,591
June 30.....	.....	4,892,855	8,918,866	11,383,287
July 31.....	.....	5,578,661	8,883,801	11,844,164
Aug. 31.....	.....	6,109,103	8,759,042	10,407,049
Sept. 30.....	.....	6,284,638	8,297,905	9,833,477
Oct. 31.....	.....	6,472,668	8,353,293	9,009,675
Nov. 30.....	.....	7,128,330	8,124,663	8,897,106
Dec. 31.....	.....	8,265,366	7,379,172	9,381,718

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

To manufacture castings and small parts, the General Fire Extinguisher Co. is building a new foundry, 250 x 300 ft., at its Warren, Ohio, plant. The contract for the work was awarded the H. M. Lane Co., industrial engineer, Detroit.

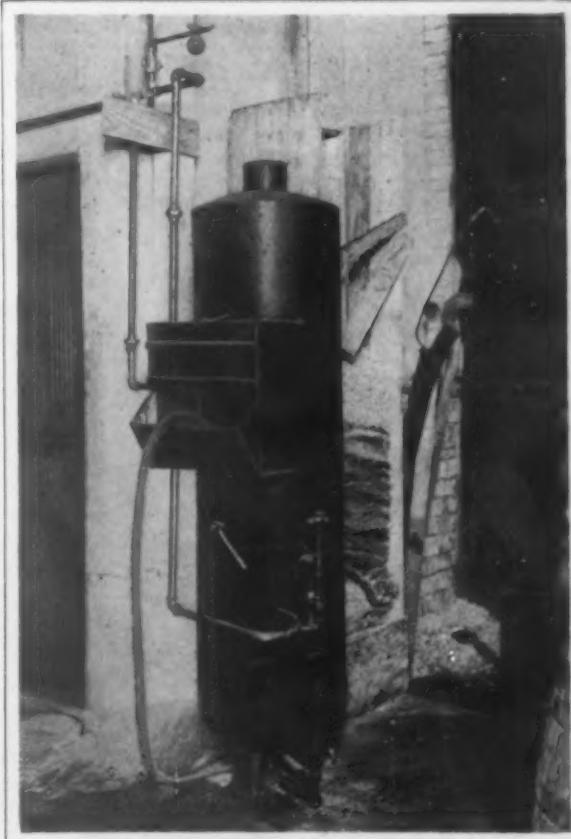
Self-Contained Sand Blast Machine

A compact self-contained sand blast machine, combining work chamber, sand pressure reservoir and dust collector, has been brought out by Scully, Jones & Co., 80 East Jackson Boulevard, Chicago. In operation, the mouth of the work chamber is closed with a canvas covering containing arm holes as well as an opening for the insertion of the hose shown in the accompanying illustration.

An electric light inside the chamber permits the operator to observe the work through the window above the mouth of the machine.

Two nozzles are available for blasting, one attached to the hose and another, also flexible, hanging from the top of the chamber. Dust is drawn off through the dust collector which is immediately above the work chamber. The outlet of the collector, when equipped for operation, is connected with a suction arrester. A screened work tray, which may be taken from the machine at the conclusion of an operation, collects the larger and heavier particles removed by the abrasive. When desired, a revolving tray, operating on the same principle as the standard sand blast barrel, can be attached in the work chamber.

At the close of an operation the air in the sand chamber, which is located below the work chamber, is released through an outlet valve on the right-hand side of the machine. With the release of the air pressure the exit valve in the bottom of the work chamber opens by gravity and the sand used in the previous operation falls into the sand reservoir below. This having been done, the machine is ready for the next operation. It will be noted in this connection that when the air



Sand Blast Machine Which Combines Work Chamber, Sand Pressure Reservoir and Dust Collector. The sand is automatically returned from the work chamber to the sand tank, thus to eliminate shoveling

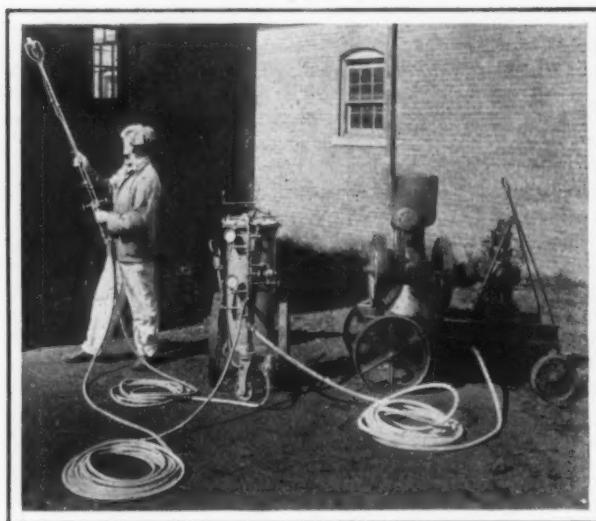
pressure is again raised in the sand reservoir the exit valve is again forced up tight against the floor of the work chamber. At the same time, the abrasive in the reservoir is thoroughly mixed by the inflowing air.

An advantage emphasized is the elimination of the necessity of shoveling the sand from the work chamber back into the sand tank. The machine is 6 ft. 6 in. high by 1 ft. 10 in. in diameter and is constructed of welded sheet steel.

Machine for Rapid Painting

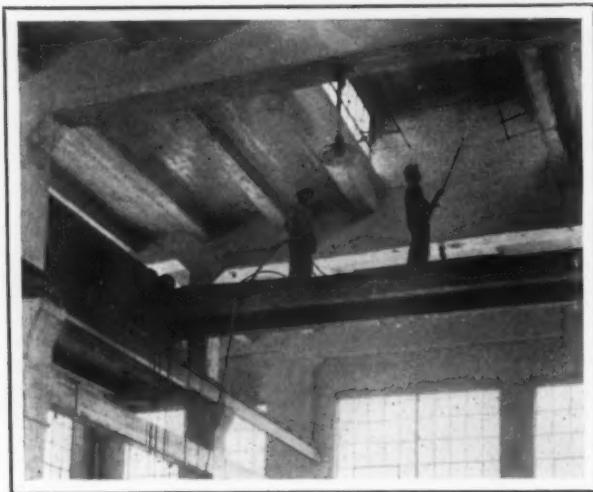
A machine designed for rapid painting of interior and exterior of factory buildings, industrial work and for general purposes, is being placed on the market by the Vortex Mfg. Co., Cleveland. The Vortex Painter, as it is called, consists of a portable air tank, air compressor and nozzle for applying the paint. The paint ready for use is poured into the tank which has a hand-operated agitator at the top. An air line leads from the compressor to the tank and a branch line to the nozzle. Air pressure on both lines is indicated on dials, and is under control.

The air and paint lines enter a double parallel valve fitting and from that to the nozzle. The paint stream



Outfit for Rapid Interior and Exterior Painting. It consists of a portable air tank, air compressor, hose and nozzle for applying the paint

under air pressure, unmixed with air, passes from a small center opening in the nozzle and strikes a caged ball which diffuses or spreads out the paint stream as it leaves the nozzle. The air through the branch line is so discharged that it forms a cone-shaped air wall that surrounds the paint stream from the time it leaves the nozzle until it reaches the surface to be painted. It is stated that this cone of air completely



Painting a Roof From a Traveling Crane with the Vortex Painter

jackets the paint stream, minimizing wastage and prevents the scattering of paint by confining it until it is laid on the surface. The nozzle is provided with an adjustment for controlling the air wall and the flow of paint is controlled by a trigger on the handle.

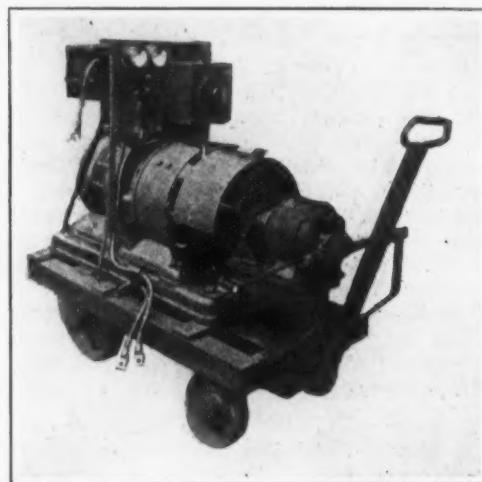
It is stated that at a recent test of the machine in painting tank cars two men painted a car in 40 minutes as compared with four men taking four hours' time using brushes, or in one-twelfth of the time required by the latter method.

Single Operator Electric Welding Outfit

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has recently put on the market what it terms a single operator electric arc welding equipment, stated to be very efficient because the generator operates at arc voltage and no resistance is used in circuit with the arc. The generator of the set has a rated capacity of 175 amperes, is of Westinghouse standard design and construction, provided with commutating poles and an exceptionally long commutator which enables it to carry the momentary overload at the instant of striking the arc without special overload protection.

The design of the control, it is explained, is such that very close adjustment of current may be quickly made, and once made, the amount of current at the weld will remain fixed within close limits until changed by the operator. There are 21 steps provided from 50 to 225 amperes. This gives a current regulation of less than 9 amperes per step which makes it adaptable for vertical or overhead work often encountered in railroad shops and ship construction. The special design of the generator and its exciter, it is stated, makes it easy for the operator to strike and maintain the arc. Although the generator is strictly a short-arc machine, the arc produced is tenacious and causes the deposited metal to penetrate deeply into the work. These features are desirable, as they make it easier for a new operator to learn to do welding work, and enable experienced welders to accomplish more in a working day.

The generator is mounted on a common shaft and bedplate with the motor. A pedestal bearing, supplied



Westinghouse Portable Electric Arc Welding Equipment in Which the Generator Operates at Arc Voltage and No Resistance Is Used in Circuit with the Arc

on the commutator end, carries a bracket for supporting the exciter which is coupled to the common shaft of the set by a special coupling. Motors can be supplied for either direct or alternating current circuits. Where an alternating current motor is used, leads are brought outside the motor frame for connecting for either 220 or 440-volt circuits. An electrician can quickly change these connections. This feature is particularly desirable on portable outfits which may be moved from one shop to another having a supply circuit of different voltages. Ball bearings are used on the single operator motor generator set. Motor generators of standard Westinghouse design of construction are supplied in capacities of 300, 500, 750, and 1000 amperes.

Surface combustion was the subject of a paper presented by A. E. Blake, sales engineer Surface Combustion Co., Pittsburgh, before a recent meeting of the Engineers' Society of Western Pennsylvania, Union Arcade Building, Pittsburgh. The theory of surface combustion was discussed in detail, and descriptions and illustrations showing examples of furnace engineering were presented.

AUSTRALIAN AFFAIRS

Engineering Standards Association Forming— New Boiler and Structural Works

(Special Correspondence)

SYDNEY, NEW SOUTH WALES, May 15.

The State engineering shops at Eveleigh, close to Sydney, have reached a high state of efficiency during recent years. These workshops are controlled by the New South Wales Railway Commissioners who claim that anything known to the engineering (metal-working) trade can be made, not only with equal celerity, but at less cost than articles of the same standard imported. The tools and machinery required for all kinds of engineering work are being turned out so cheaply that foreign importations are likely soon to be a thing of the past.

The specialty of the Eveleigh workshops is the building of locomotives and the steel parts of railroad cars. From such material as condemned rails, old bolts, wornout fish plates, etc., the machines turn out buffers and springs. A buffer is manufactured at Eveleigh out of scrap material in 71 sec. from the time of entering the furnace. An oil-burning furnace attached to an Ajax forging machine is used for making fish-plate bolts, rivets and dog spikes, which are fashioned at the rate of 98 to the minute. The machine doing this work makes 49 patterns of bolts, spikes and rivets. All the state employees at the Eveleigh Works, from manager to workmen, are Australians. At present the workshops are endeavoring to overtake the acute shortage of locomotives, but a goodly number of engines will have to be imported to bridge the gap between supply and demand.

Standards Association to Be Formed

An Australian Engineering Standards Association is shortly to be established with headquarters in Sydney. The object of the association is to give effect to a systematic scheme of engineering standardization throughout the commonwealth. It has been decided that the general functions of the association shall be as follows: (1) To decide what standardization work shall be undertaken. (2) appoint sectional committees to prepare specifications. (3) carry out research work prescribed by the sectional committees. (4) pass judgment on the specifications prepared, arrange for the publication of approved specifications and keep in touch with kindred institutions in other countries.

It is proposed that the main committee of the association shall be appointed by the commonwealth government, and that its members shall be nominated in the manner following: (a) Six members to be nominated by the Institution of Engineers of Australia. (b) One member—a fully qualified engineer—to be nominated by each of the state governments. (c) Three members, one of whom shall be chairman, to be nominated by the Australian Institute of Science and Industry. Power is reserved to the main committee either to nominate members on account of their eminence in the engineering profession, or to recommend that other engineering associations and societies in Australia be invited to nominate representatives for appointment.

New Large Boiler and Structural Plant

The new association will be the creation of the Institute of Engineers of Australia and the Australian Institute of Science and Industry, themselves both new bodies. The preparation of standard specifications for structural steel and sections, for railroad rails and fish plates, and for tramway rails and fish plates is practically completed. It is intended to publish these specifications at an early date. A number of requests have already been received from manufacturers to convene standardization conferences in regard to various materials. To meet these requests data are being collected on which to base standard specifications for materials used by carriage, wagon and motor-body builders. The address of the Australian Engineering Standards Asso-

ciation will be Royal Society House, Elizabeth Street, Sydney, New South Wales.

An ambitious company in Newcastle (New South Wales) is erecting works for the manufacture of boilers. Its aim is to supply the whole of the requirements of New South Wales and to have enough over to export to other states. Thirty acres of land have been acquired at Broadmeadow, near Newcastle, and the way is being prepared for putting down the plant. Three steel structures are being erected each 200 ft. in length. Cranes of 40 tons and 20 tons respectively will operate in each shop which will be 50 ft. wide. A boiler-making equipment of modern type has been purchased in England and the company will manufacture Lancashire, Cornish, Colonial and vertical boilers. In addition to making boilers the company intends to manufacture structural steel for building pit heads, bridges and frames for buildings, etc. The company is also putting down an iron foundry at Wickham, which is likewise close to Newcastle.

Iron and Steel Works of Queensland

The location of the State iron and steel works of Queensland is to be at Bowen, a coastal town in the central northern part of the state. Experts consider that Bowen is admirably situated. The premier of Queensland (Mr. Theodore) has made the announcement that an early start will be made with the preparation of the site and the installation of the necessary machinery. A loan of at least £3,000,000 will be required for developing the mines and Mr. Theodore is now on his way to London to try and raise the money. As a result of the Queensland Government's decision Bowen is likely to awaken from a sleepy subtropical town into a flourishing city. The requirements of the Government alone will keep the state works, when started, at full pressure. The initial aim of the works will be to produce 350 tons of iron and steel per day. The by-product of the industry—slag cement—will be used by the Government for making roads and building workmen's dwellings.

Motor Alcohol from Molasses

A development of the immediate future in Australia will be the use of internal combustion engines capable of running on alcohol fuel. In Australia, as in England and America, successful experiments have been made, and the way will soon be open for the employment of alcohol engines in large numbers. A satisfactory demonstration of the use of alcohol distilled from molasses, in internal combustion engines, was recently carried out in Brisbane (Queensland) under the auspices of the Australian Institute of Science and Industry. A number of motor cars of varying types were supplied with methylated spirits, and all started easily. The engines were tested under normal conditions, without structural alteration or any readjustment of carburetors. The test proved that the institute had overcome the difficulty of starting engines from the cold by reducing compression, and that, with the assistance of priming, a single-fluid start upon alcohol was possible. In previous experiments the start had to be made from petrol, with a subsequent switching over to alcohol. It is estimated that if all the molasses in Queensland were distilled (it is now mostly thrown into the river), it would be possible to obtain over 4,000,000 gal. of spirit—sufficient for Queensland's requirements of power alcohol.

E. H.

The Interstate Commerce Commission, in the case of the Highland Iron & Steel Co. vs. the Baltimore & Ohio and other roads, has held that the rates legally applicable in scrap iron from Burr Oak and Chicago, Ill., to Terre Haute, Ind., are not unreasonable or otherwise unlawful.

The Wayne Steel Co., Erie Pa., has placed its open-hearth plant in operation. This is equipped with two 25-ton basic open hearth furnaces. A large part of its product will be consumed by the U. S. Horse Shoe Co., Erie, a subsidiary.

Electric Welding of Structural Steel

Factors Which Determine Quality of Weld— Effect of Design of Joint, Size of Electrode, Value of Current and Skill of Welder

BY OTIS ALLEN KENYON*

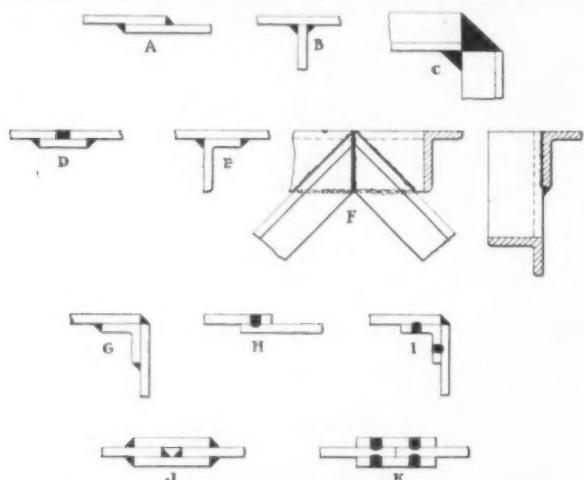
FOR many years those well versed in the art of arc welding have known that structural steel could be joined together for building purposes at lower cost and higher joint efficiency than is attained by either riveting or bolting. However, building departments and other inspection and control organizations have refused to allow the use of welding in building construction, on account of the fact that they did not feel sure of a welded joint.

Welding, like reinforced concrete, depends for its quality and strength largely upon the skill and integrity of the workmen who install it, and building in-

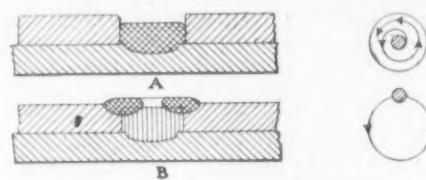
be reduced to a minimum by proper choice of the first three, and can be maintained by proper superintendence and what is more important, a failure in this factor, the other three being properly maintained, can easily be detected by superficial inspection when one is experienced in the art of arc welding.

Design of the Joint

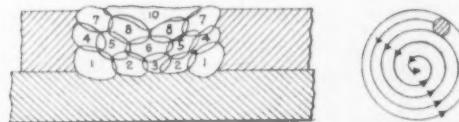
The joints which are available for construction purposes may be divided into a relatively small number of elementary types. These we have shown in Fig. 1. Examination of these joints will show that fundamen-



Various Types of Joints That Are Suitable for Building Construction



Sketches Illustrating Method of Making Rivet Welds on Plates Up to and Including $\frac{1}{4}$ -in Thick



Sketches Illustrating Methods of Making Rivet Welds on Plates of $\frac{1}{2}$ -in. and Greater Thickness

spectors have assumed that it was impossible to judge the quality of a weld once it was made, and for this reason they have not been convinced by the various tests that have been performed for their benefit, although such tests have demonstrated that welds can be made with 100 per cent joints.

Comparing welding with reinforced concrete, it is possible to lay out a welding job and determine in advance a sufficient number of the factors that contribute to the value of a joint to make a welding job much more definite and independent of the operators in its characteristics than is possible with concrete.

Factors Which Determine Quality of Weld

In a welded joint there are four main factors which determine the quality of the weld.

- 1.—The design of the joint.
- 2.—The size of the electrode.
- 3.—The value of the current.
- 4.—The skill of the welder.

Of these four the design of the joint is most important, one reason for which is that by properly designing a joint the skill required by a welder can be reduced to an almost negligible quantity. Having a definite joint to deal with, the size of the electrode can be determined by any one versed in the art of welding, and the choice of current value follows with the choice of electrode diameter.

Of these four factors, three of them can be determined by the construction engineer, and it is possible to employ electrical equipment and structural methods that absolutely assure the maintenance of these three factors within definite limits. The fourth factor can

tally, considered there are only three types of welds involved, namely: A fillet weld, a butt weld and a rivet weld.

A fillet weld is one in which two intersecting and diverging surfaces are joined, a butt weld is one in which the two surfaces—the edges of which are separated by an air-gap—are joined, and the rivet weld is one in which a hole is pierced in one of the parts, then filled in such a way as to fuse the deposited metal to the inside plate and to the sides of the hole. The fillet weld if made in a downward position involves simply advancement of the arc along the line of the weld, transferring it alternately from one side to the other. If made in a vertical direction, the arc is carried along the triangle in a spiral form, working from the bottom toward the top.

The butt weld is made when welding downward by working the arc in a crescent shape, advancing along one edge then backing it on the metal that has been deposited, crossing the gap and advancing on the opposite edge, then backing up and advancing on the first edge and so on. If welding in a vertical direction the arc must be carried around the periphery of the weld in a spiral fashion, beginning at the bottom and working upward.

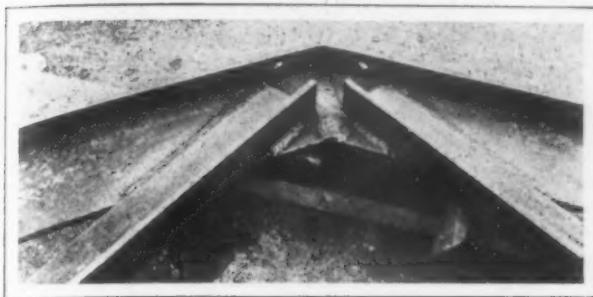
Overhead welding should be avoided wherever possible in construction work, as it requires special skill and is slower to do, and if the structure is properly designed it can usually be avoided.

Vertical welding, however, usually gives better results than any other as far as quality of the weld is concerned. This is probably due to the fact that the form of the molten puddle is such as to facilitate the fluxing out of all impurities, leaving them on the outer edge of the seam.

*Engineer, Ray D. Lillibridge, Inc., New York.

Downward welding is the most rapid and requires the least skill, and the quality can be closely determined by proper design of the joint and choice of the materials, and current used.

The rivet weld should be interesting to the structural engineer, as it permits him to use types of the joints that are quite similar to his usual practice. Tests on $\frac{3}{8}$ -in. plates using $1\frac{1}{2}$ -in. rivets proved that a single row of rivet-welds was equal in strength to a double row of the same size rivets. The reason for this may be due to the fact that rivets, no matter how tightly they may be driven, once they give a bit are subjected to a bending moment; while a rivet-weld, by virtue of the contraction of the molten metal and fusion



Details of Welds on Roof Truss

of the bottom and the sides of the hole, draws the plates so tightly together that there is no possibility of a bending moment being applied to the rivet. It is pure shear, and when such a joint is pulled apart it will be found that the weld comes clear, pulling out a portion of the plate in which no hole was provided. It looks very much the same as when a corn is taken off of a toe and comes out by the roots.

There are two distinct types of rivet welds, one on the thin plates and the other on thick plates. The first type is used on plates up to $\frac{1}{4}$ in. thick and the second type on $\frac{1}{2}$ in. and larger.

The diameter of a hole must be sufficient to provide the space necessary to contain the amount of metal that will flow off of the electrode, while the arc is traveling over the area of the bottom of the hole. Hole diameters for different thicknesses of plate as determined by actual practice are given in the following table:

Plate Thickness, In.	Diameter Hole, In.
0.05	$3/16$
$1/16$	$1/4$
$3/32$	$3/8$
$1/8$	$1/2$
$3/16$	$5/8$
$1/4$	$11/16$
$1/2$	1
$3/4$	$1\frac{1}{4}$
1	$1\frac{1}{4}$

On plates up to and including $\frac{1}{4}$ in. in thickness the method of welding is as shown in Fig. 2. The arc is started at the center and bottom of the hole, as shown in (A) and worked in a spiral motion toward the outside edge, finishing by a complete circle as shown in the outside edge (B); the result is fusion at the bottom of the hole over approximately 70 per cent of the area and the fusion around the entire top of the hole. The walls of the hole near the bottom are not fused to the deposited metal. If we attempt to carry the fusion into the bottom corner of the hole completely around, the metal from the pencil will flow in and fill the hole without fusion before the arc has travelled half way around. Practice has proven that by making the hole large enough so that the fused portion at the bottom is greater than the area of a rivet for that size plate, that the joint will be stronger than a rivet of the size usually employed in plates of that thickness.

The type of joint used for plates of $\frac{1}{2}$ in. and greater thickness is shown in Fig. 3. In this joint the depth and diameter of the hole are large enough to permit complete fusion. The electrode is started in the lower corner and carried in a spiral completely around the bottom and toward the center, one layer having been completed, a second one is made in exactly the same

way, and so on until the hole is filled. The successive convolutions are shown by numbers in Fig. 3.

Welded joints permit many simplifications over riveted joints on account of the fact that a welded joint does not necessitate any weakening of the plate, due to holes. Even where holes are inserted as in rivet-welds, the operation of welding is such as to fill the hole with metal that has a greater tensile strength than the structural steel itself.

As far as the strength of a weld is concerned, it is possible to lay out the work and choose the various factors in such a way that any ordinary welder can make a joint showing at least 60,000 lb. per sq. in. in the welded section.

Size of Electrode

The second factor is determined by the design of the joint more than anything else, and in discussing this factor only relative terms can be used. First of all, there is a maximum and minimum size electrode that can be used in any given instance. The minimum size is that size where the heat of the arc is insufficient to produce a welding crater in the joint. In other words, where the heat production capacity of the electrode is overbalanced by the heat dissipating capacity of the joint the maximum size of electrode that can be used in any given joint is also determined by the heat dissipating capacity of the joint as compared with the heat dissipating capacity of the electrode, although this is sometimes a theoretical limitation, the practical limitation being the skill of the welder.

Smaller electrodes producing energy at a slower rate and melting metal at a slower rate slow down the work to a corresponding degree. However, on account of the fact that the arc is comparatively small, it is necessary to move the electrode over the entire surface of the joint in order to fill it, the consequence of which is that it is almost impossible to fill a joint without making a good weld when a small electrode is used.

Increasing the size of the electrode increases the heat input and therewith the rate of melting of the



Detail of Foot of Column

electrode. If the size is increased beyond a certain amount, it becomes possible for a welder by poor practice to allow the metal to flow ahead of the crater and fill space without fusion to the sides of the joint. On the other hand, an expert welder will get better fusion and a better weld with a large electrode than he will with a small one. Consequently, the size of the electrode for any given class of work must always be a compromise between speed of production, fool-proofness and personal equation of the welder.

Value of the Current

The value of the current is determined by two factors, the size of the electrode and the skill of the welder, and practically considered it is always limited by the skill of the welder since in increasing the current, speed and quality of welding increase up to the point where the welder is no longer able to manage

the electrode. The trouble is that increasing the current increases the speed of all his motions at a rate greater than the first power of the current. Consequently, if the current is increased too far he loses coordination of the various motions and produces a poor job.

Therefore, the choice of current for a given size pencil is practically always determined by the skill of the operator. The following values may be considered good practice for building construction work with operators having average welding skill.

Electrode Diameter	Current in Amperes
0.125	105 to 115
0.135	120 to 130
0.156	140 to 160
0.188	190 to 210

Skill of the Welder

Ordinarily the skill of the welder involves choice of joint, electrode size and current, as well as the actual manipulation of the arc. In all cases it is possible to determine the two factors independently of the operator, and in some cases by using special electrical equipment it is possible to determine the current and limit the length of the arc independently of the operator, leaving for his own determination only the manipulation of the arc, and by means of superficial inspection it is possible to check up the degree of success he has

attained in the manipulation of the arc. Therefore, as far as construction work is concerned, it is now possible to conduct welding with the same degree of safety as riveting or any other form of approved joint now in use.

The first actual achievement in the line of building construction by welding was made recently when the Electric Welding Co. of America let a contract to T. L. McBean, who put up a structural steel shop, every joint in which was made by electric welding. In this structure, not a bolt nor a rivet is used except where wood is joined to steel.

In connection with this investigation $1\frac{1}{4}$ x $\frac{3}{8}$ -in. bars were lapped $1\frac{1}{4}$ in. and welded as shown in the first illustration of Fig. 1, and tested in direct tension where they developed the full strength of the bar, the break occurring not nearer than 3 in. to the weld and developing a tension of 60,000 lb. per sq. in.

Another test was made with two $2 \times 3 \times \frac{3}{8}$ -in. angles set at right angles and lap-welded at the intersection. In the machine they were set up in such a way that the load was applied at the end of an 8-in. lever arm, developing a beam load of 11,375 lb. at the weld or a torsional stress of 91,000 lb. with no apparent distress to the weld, although the angles buckled to such a great extent that they finally failed to resist the load.

Ferromanganese and Manganese Ore Imports in April

Ferromanganese imports in April were 3018 gross tons which compares with 2857 tons per month for the first quarter and with 2752 tons per month in 1919. The total for the 10 months ended April 30, 1920, has been 29,298 tons as against 22,206 tons for the same period ended April 30, 1919. Ferromanganese exports were 33 tons in April, making the total for this year 135 tons against 408 tons in all of 1919.

Manganese ore imports in April were 35,088 tons which compares with an average for the first quarter of 14,846 tons per month and with 27,779 tons per month in all of 1919. The total imports for the 10 months ended April 30, 1920, have been 186,986 tons as compared with 421,258 tons to April 30, 1919.

Farrel Foundry & Machine Co. Buys Plant

The Black Rock plant of the Bethlehem Shipbuilding Corporation in Buffalo, the property of the Navy Department, has been acquired by the Farrel Foundry & Machine Co., manufacturer of chilled rolls and heavy machinery, Ansonia, Conn. The purchaser will carry on the same line of work at this Buffalo plant that it does at Ansonia, with the lighter work performed at Buffalo, which is equipped with lighter cranes.

The Buffalo plant is 200 ft. x 725 ft., has four bays equipped with 12 traveling cranes, a power house, etc. Franklin Farrel, Jr., first vice-president, states that his company may either take on some new lines if the present rush in its standard lines lets up, or expand present lines to utilize all the capacity gained by both plants in operation. A. G. Kessler is general manager of the Buffalo plant.

Future of Metal Furniture

S. S. French, vice-president and general manager of the General Fireproofing Co. at Youngstown, Ohio, believes the steel furniture industry, now in its infancy, offers an unlimited field for development. "In some lines, such as desks, safes and shelving, the potential market is enormous and the surface has hardly been scratched. There is no question that steel equipment will eventually be cheaper than wood. Quarter-sawed oak a little over a year ago sold freely at about \$110 per 1000, and the price to-day is about \$350, which is forcing the wood people to use substitutes, which tend to make their product of poorer quality. Lumber is not a product that you can take out of the ground, as is evidenced by the fact that 38,000,000,000 feet was

cut last year, and the estimated growth, only 12 per cent of that, and it will unquestionably become more scarce as years go on, while steel will become cheaper. I consider our business, therefore, as an industry basically sound."

Railroad Wage Award Probable

The United States Railroad Labor Board, which has been holding hearings at Chicago for two weeks, concluded its sessions on June 4. E. M. Barton, chairman, has announced that the board will go into executive session at Washington "with 200 questions to be decided." While it will require a great deal of time to conclude deliberations on all the subjects in question, the chairman indicated that a partial award would probably be announced within a week or 10 days.

The Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., the Reed-Prentice Co., Worcester, and the Becker Milling Machine Co., Boston, will open a joint store at 26 North Clinton Street, Chicago, on Aug. 1. Temporary headquarters have been taken with the R. E. Ellis Engineering Co., 621 West Washington Boulevard. The Clinton Street store will have a floor space 33 x 132 ft. and will carry a complete stock of the products of the three companies. F. C. Hermann, for 15 years identified with the machine tool business in Chicago, latterly with the Stocker, Rumely, Wachs Co., has become identified with the companies as sales representative in the Chicago district.

The Gas Products Co., Columbus, Ohio, put in operation its plant for the making of compressed acetylene July 1, 1919, and after operating the acetylene plant 60 days, it was decided to build an oxygen plant. The company's main oxygen building is 25 x 150 ft. It has just been awarded the contract to take care of four shops of the Baltimore & Ohio Railroad, and recently received the award of nine additional shops of the Pennsylvania Lines West.

The Buick Motor Co., Flint, Mich., has promoted W. G. LaRock to the position of assistant purchasing agent, Firth Brooks to be manager of the transmission plant, and Capt. S. Garland Butler, office manager of the public service department.

The Iron Mountain Co., which recently completed a plant at Ninety-fifth Street and Cottage Grove Avenue, Chicago, will soon be producing at the rate of 50 axles a day. The plant contains 44,000 sq. ft. of floor space.

TRADING WITH THE "ENEMY"

Government Will Not Interfere With the Resumption of Business With Germany

WASHINGTON, June 22.—From inquiries which have reached the Washington Bureau of THE IRON AGE it is apparent that American industry is still hampered by the uncertainty which attends the continued existence of a state of war with Germany and Austria. While Congress was in session, with the President's peace treaty unratified, nothing was done to assure the industries of the country that there was no longer a wartime risk in renewing trade relations with "the enemy." Gradually, where business relations with these so-called enemy countries had begun to grow, despite this uncertainty, experience has taught many of these industries that there is no danger of Government interference or confiscation.

Now that Congress has adjourned, however, and President Wilson has promised not to recall it "except in grave emergency" until the constitutional date for the next session—Dec. 6—American business men are more insistent than ever about knowing their exact status in negotiations with the industries of Germany and Austria.

None of the departments in Washington is willing to take the responsibility of declaring that the war is at an end so far as business is concerned. In the present condition of the President, a statement from the White House which would end all hesitation is out of the question. The State Department is the natural arbiter of all these questions, but it, too, is unwilling to make a public declaration concerning this situation. Francis P. Garvan, Alien Property Custodian, who is also directly involved, is on his way to San Francisco and will not return to Washington until some time next month. So far as Congress is concerned, there is no possibility of action until next December, and no likelihood of action before a special session in April.

No Interference With Trade With Germany and Austria

In the meantime, however, it may be said on high authority that the Government officials will do nothing to interfere in any way with the resumption of business relations with Germany and Austria. Both the State Department and the Alien Property Custodian recognize the general trade licenses granted last year by the War Trade Board, authorizing, subject to minor limitations, "all persons in the United States, on and after July 14, 1919, to trade and communicate with persons residing in Germany and to trade and communicate with all persons with whom trade and communication is prohibited by the trading with the enemy act." This is the final determination of that subject. The only limitations involved forbid dealing with Soviet Russia and prohibit the importation, without a special license, of dyes, dyestuffs and chemicals from Germany and Austria.

It may be stated with similar authority that the Alien Property Custodian will not interfere with any "enemy" money or property which may come into American hands under such a renewal of trade. This applies, not only to direct commercial relations but extends to every line of industry and includes royalties which may become due from Americans to Germans or Austrians on new patents or on patents which were not specifically taken over by the Alien Property Custodian during the war.

So far as I can find, the only reservation to be made would be in the case of a new patent which conflicts with an enemy patent previously sold by the Alien Property Custodian, in which case the latter would feel bound to assist the purchaser holding title under it to

secure his rights. Even then, however, the Government would not attempt to take over the conflicting patent.

German Licenses Necessary

No restrictions of any kind are now imposed by the American Government on any exports. American industries, however, must not forget that Germany has very severe restrictions both as to imports and exports, and licenses must be obtained from the German export and import commissions before goods may be sent into or out of Germany. Certain classes of goods, particularly foodstuffs and raw materials, may not be exported at all from Germany. Drastic restrictions are imposed upon the importation of luxuries.

Shipping between the United States and Germany is now carried on directly to Hamburg and Bremen, as well as from neutral ports with both Germany and Austria.

Difficulties are reported because of lack of adequate land transportation facilities and, in some instances, because of restrictions imposed by neutral nations through whose ports shipments are sent.

It is declared, however, that there is no danger of confiscation by any authority, of American goods sent into Germany or Austria, provided they have been properly licensed.

No German or Austrian Passports

So far as passport regulations are concerned, the United States Government still does not issue passports either to Germany or Austria. Persons desiring to visit those countries must obtain passports to adjoining countries. No effort is made to prevent their entering either Germany or Austria, but such entry is entirely at their own risk.

German or Austrian nationals intending to visit the United States must secure a passport from their own Government and have it viséed by the American consul in an adjoining country. We have no consul in either Germany or Austria. Only those persons, however, will be admitted to the United States when their coming to this country is construed by the State Department officials to be clearly beneficial to American commerce.

German or Austrian nationals in the United States wishing to leave this country must apply for a passport to a Swiss or Spanish consul, respectively, and also obtain a passport from the United States Government. No obstacles, however, are now placed in the way of departure of aliens from the United States.

Despite this apparent lack of official obstructions to a resumption of "enemy trade" relations, the roadway is far from being smooth. During the treaty fight, the Administration found that every obstacle it put in the way of this commerce resulted in new pressure upon Congress for a Wilsonian peace. Among such obstacles was an order by President Wilson forbidding the issuance of declarants' passports to applicants of enemy origin, pending the ratification of the peace treaty. As a result, men of large international interests found travel impossible. In no case could they receive assurance that they would be permitted to return to the United States.

O. P. S.

The Gillespie Mfg. Co., Gillespie Motor Co., Gillespie Foundry Co. and the Brokaw-Eden Co. have consolidated under the name of the Gillespie Eden Corporation, 50 Church Street, New York. The company manufactures washing machines, castings, motors and wringers at plants in Lowell, Mass., Paterson, N. J., and Alton, Ill. Officers of the corporation are: W. H. Marshall, chairman of the board; T. H. Gillespie, president; E. L. Bergland, H. G. Seaber, P. J. Holsworth and George De Laval, vice-presidents; F. J. Nash, secretary; and H. S. Hart, treasurer.

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Steel Supply and Demand

The monthly reports of the American Iron and Steel Institute show that during the first five months of this year 14,653,744 gross tons of steel ingots were produced by 30 companies which in 1918 contributed 84.03 per cent of the industry's steel ingot output. This indicates that during the five months the entire steel industry produced at the rate of about 41,400,000 tons a year. Such an output, if shown for a year, would fall short of the record, made in 1917, by 5 per cent, yet productive capacity has been increased very considerably since that time. From the armistice up to the steel strike of last September production of steel was restricted by lack of orders. Since then it has been restricted by lack of order. The steel strike and the coal strike represented a lack of order, and the deficiency in transportation that came next represented distinctly a lack of order.

By reason of the difficulties of the past nine months there has been no real test either of production or of consumption. Except for a partial respite in February and March the producers have not been able to operate at anything like their capacity, while consumers have had no encouragement to show what they could do or would like to do. Investors in large construction works, for instance, are not encouraged to go ahead with their projects when the industry from which they would require large supplies of material is beset with difficulties and it is not known whether it will be able to make deliveries.

The ordinary manufacturing consumer, again, whose operation involves a steady flow of material through his plant, has not been in position to disclose what his real requirements are. If steel promises to be scarce he is likely to overbuy. If deliveries at any time exceed his current consumption he gladly puts the extra steel into stock, and thus the amount of steel that he accepts is not necessarily a measure of his rate of consumption, while chronically he has been short of steel and there has been little if any information to show whether he really needed 10 per cent or 40 per cent more steel than he was receiving.

As noted above, production in the first five months of the year has been at the rate of about

41,400,000 tons of ingots a year. Five months is a short time for such wide variations in output as have occurred. The March rate was 11 per cent greater than the January rate, while the April rate was 12 per cent under the March rate, and the rate in the third week of April was probably more than 25 per cent under the March rate. From that low point to the present, again, there has been an increase of probably 30 per cent or more.

The great fluctuations in the rate of production, however, have been exceeded by the fluctuations in the rate at which steel has been delivered to buyers, for whatever the production in April and May the actual deliveries were much less. In a short time, probably, the deliveries will materially exceed the output, for there are large stocks of steel at mill to be moved, and a fresh complication will be presented to any one who seeks to estimate, by market developments, what is the real consumptive demand of the country at this time.

In this confusion there is one stable thing, the business being done by the United States Steel Corporation. The unfilled obligations of the corporation increased in May by 580,719 tons, an amount easily larger than the amount by which the corporation's shipments fell short of capacity. In other words, the bookings in May were greater than the month's capacity. On the one hand, it is shown that the corporation is content to receive the Industrial Board prices, effective March 21, 1919, for an indefinite period, and on the other hand it is shown that the corporation's customers are willing to pay those prices for an indefinite period, for the unfilled tonnage of June 1 is equal to the corporation's prospective production to March 1, 1921, as an average date, if the production be taken at an average of 90 per cent of rated capacity.

Cable advices to THE IRON AGE show the British output of both pig iron and steel for May to be larger than for any month this year or for any month in 1919. The steel ingot and casting production in May was 864,000 gross tons, making

the average 806,000 tons per month to June 1. The pig iron output in May was 739,000 tons, making this year's average 684,000 tons per month. For the first five months of the year British steel output has been at a greater yearly rate than the total for any calendar year, or at 9,672,000 tons, as against a record of 9,591,000 tons in 1918. An interesting fact is that the pre-war relation of pig iron and steel has been reversed, the steel output now being considerably the greater. In 1913 the pig iron output was 855,000 tons per month and the steel production 639,000 tons per month. To June 1, this year, the pig iron output has been 684,000 tons per month and that of steel 806,000 tons per month. The present showing is surprising in view of the continued impediments to full industrial operations in Great Britain.

Coal Exports and Prices

The statement is frequently made that coal is scarce and high priced because of large exports and it has been urged that exports should be discontinued in favor of domestic needs. Official statistics show that exports are only normal, judged by pre-war standards. This applies to both anthracite and bituminous coal as well as coke. In 1913 exports of anthracite were 4,150,000 tons; in 1919 they were 4,440,000 tons. In 1917 they rose to 5,360,000 tons. In 1913 bituminous coal exports were 17,986,000 tons; in 1919 they were 17,969,000 tons. Due to war demands, they reached 21,255,000 tons in 1917. In neither anthracite nor bituminous coal had exports up to April 1 of this year shown any increase over the 1919 rate. Nor has there been any increase in the coke movement. In 1913 coke exports were 881,600 tons; in 1919 they were only 528,670 tons, while in 1917 they were nearly twice that amount.

To-day, as was the case in pre-war time, Canada and Cuba are receiving the greater part of the coal exports, although in 1919 Italy is credited with 1,633,000 tons of bituminous coal against less than one-third as much in 1917 and none in 1913. Bunker coal does not appear in the above figures; the amounts for both 1917 and 1919 were somewhat above 7,000,000 tons.

If propaganda is at work in the attempt to put the responsibility for high coal prices and scarcity on exports, the above facts prove its irresponsibility. To the coal mine and railroad labor wars are largely due the serious fuel situation which faces not only the average householder but practically all industry.

New Use for Electric Furnaces

Electric ferroalloy furnaces have been diverted to a most interesting use commercially. A Southern company, which made synthetic pig iron, ferromanganese, ferrosilicon and other similar products during the war in its electric furnaces, found itself after the armistice with the problem of finding a profitable use for its equipment. Prices for ferromanganese and low-phosphorus pig iron had declined and in the production of certain other alloys there was keen competition. The result of wide investigations has been the manufacture in this type of furnace of phosphoric acid and potash on a

fairly large scale. For making phosphoric acid, phosphate rock is smelted in the electric furnace and the phosphorus driven off as phosphoric oxide, suspended in the gases. These are collected and treated by the Cottrell electrical precipitation system in which the phosphorus compounds are collected electrically as a fine powder. By further treatment and concentration a superior product is obtained, free from many of the impurities which are present when sulphuric acid is the disintegrating agent.

In the manufacture of potash, Southern shales are similarly treated, with the formation of oxides of potassium in the gases and their electrical precipitation and collection.

The substitution of electricity for expensive chemicals in these interesting cases is not only a feature of this new practice, but there is the other novelty that electricity is used both as the destroying or breaking-down agent and as the medium by which the final products are recovered.

An Honorable Labor Union

When the steel strike of last fall was declared, and for some time afterward, the radical leaders, of whom the most prominent was the syndicalist, William Z. Foster, were unable by persuasion, intimidation, or any other means to force the Amalgamated Association of Iron, Steel and Tin Workers, one of the oldest labor organizations in the country, to break its contracts with the steel companies in order to promote the strike. The attitude of the Amalgamated made it so unpopular with the radicals that an open disruption was imminent. The soreness which was felt at that time was never healed, and has just culminated at the recent Montreal meeting of the American Federation of Labor in the decision of the Amalgamated to withdraw from the National Committee of the Federation. At the meeting of the Federation, David J. Davis, vice-president of the Amalgamated, said:

"The Amalgamated Association is through with this committee for all time, unless its officials get out. We do not agree with their methods of organization and cannot with honor continue to co-operate with them. The committee would have us violate our contracts with the independent steel concerns, which we are in honor bound to respect."

The position taken by the Amalgamated in Montreal, as well as its action at the time of the strike, reflects great credit upon it. We distinctly recall that at the beginning of the Foster steel strike the one clear note from the side of labor came from M. F. Tighe, president of the Amalgamated, who, in his statement to the members, said:

Our association has entered into contracts with many employers who recognize and treat with the association in its many functions. These contracts are bonds of honor between men, and it becomes us to honor them as such.

The pledges given by the officials and representatives of both the manufacturers and our association at Atlantic City to hold these contracts inviolate must be ever in the minds of our membership during this scale year.

The strict observance of these contracts on the part

of our membership at this time will bring to them and to the association the credit that comes from fair dealing. It will also demonstrate to the world at large the benefits to be derived from the principle of collective bargaining, embodying the spirit of mutual co-operation.

Thousands of our members at this very time are preparing to make every sacrifice to secure for themselves the principle of collective bargaining. Let those of our membership who have that prize show by their fealty to that principle the benefits derived by strict adherence to every feature of it.

It is worth while at this time to recall the above words and realize that there are still some labor leaders who adhere to the old-fashioned notion that a contract is a contract, which even the labor union has no right to violate. It is not surprising that the Amalgamated is breaking away from the Federation, whose president failed to take any stand against the syndicalist, Foster, when the evidence of the vicious teaching of that radical was presented to him.

Railroad Responsibilities

The success of the railroad officials of the United States in attaining three aims has put them under a grave responsibility which it is to be hoped they fully realize. If they do not show by results that they measure up to it, the public will hold them to a strict accounting.

The three things the railroad men have accomplished are: 1. To have the railroad lines restored to their control, thus avoiding Government operation if not also Government ownership. 2. To have their earnings guaranteed by the Government. 3. To make the public realize that it must pay for railroad operation and service.

It has been dinned into the ears of the public that "the public must pay." The public now fully realizes that it must pay, and it is content to pay, but it is certainly going to demand that it receive its money's worth. The public is not composed wholly or in large part of ignoramuses. Often it can detect inefficiency and see waste where these things exist. The larger the shipper the more freight paid, the more taxes paid and the greater the opportunity to observe how the railroads really are being run.

When the Government of the United States guarantees that the railroads shall earn at least 5½ per cent on their investment, the railroad managements are bound to operate the lines economically. The public has been informed, perhaps up to the point of being irritated by the iteration and reiteration, that it must pay, and it will see that the Government holds the railroads to a wise use of the funds it permits them to collect. Winning their present rate case before the Interstate Commerce Commission is but a skirmish. The public is willing that the railroads be given a fair and even liberal trial. Its interest in this case as it is pending is not as great as will be its interest afterwards, in observing how the railroads are operated when the rates desired have been established and are being paid—by the public, as the public will not fail to remember.

The railroad men have burned their bridges be-

hind them in the matter of Government or private operation of the railroad lines. They have staked everything on one throw. Practically no one denies that the issue now is simply either the success of the present experiment or the establishment of Government operation.

There is much more in the matter than the mere issue of the one thing or the other. The railroad men may be content to have it turn out simply that they make one more try and if they fail they gracefully resign in favor of the United States Government. That may be a satisfactory arrangement for the railroad officials, but it is not a satisfactory arrangement for the American public. The public does not want Government operation. No one can possibly doubt that. If the railroad brotherhoods want Government operation that is only one more reason why the public does not. No great amount of discrimination on the part of the public is requisite to see that point.

The public would have no hesitancy in fixing the responsibility for the railroads being turned over from private to Government operation. It would not be the fault of the Government, but the fault of the private managements. Any defection, lack of service or inefficiency that seems likely to pave the way toward Government operation of the railroads will instantly incur the ill will of the public, which does not want this experiment to end that way, whether or no railroad officials could bring themselves into a state of resignation to such an ending.

The public is going to pay, and it is going to watch, and watch keenly. Weighty responsibilities rest upon railroad officials. Railroads have conducted various "publicity campaigns" and the possibility of the public talking back should be considered.

Will Inspect Trumbull Steel Co. Plant

The Pittsburgh section of the Association of Iron and Steel Electrical Engineers will make an inspection trip to the plant of the Trumbull Steel Co., Warren, Ohio, Saturday, June 26. These works embrace an open-hearth steel plant, sheet and tin plate and hot and cold-rolled strip mills. The main features of the plant are one 5000-h.p. reversing blooming mill motor, driving a 36-in. reversing United Engineering Co.'s blooming mill, two unit motor and two unit generator. This mill rolls at the rate of 60 ingots per hour in sizes from 20 in. to 22 in. down to 6¾ in. to 6¾ in., weight 6700 lb.; two 3500-hp., 93 r.p.m. induction motors driving one four-stand roughing and one six-stand finishing Morgan continuous sheet bar mill; three 1200 h.p. and one 1500 h.p. Sherbius sets, driving a continuous strip mill, considered to be the fastest in the world. Seven 100-ton open-hearth steel furnaces supply the steel for the operation of these mills. The gas valves and doors on these furnaces are all electrically operated.

At the technical session to be held in the evening after dinner, A. W. Mohrman and W. F. Rese of the Trumbull Steel Co., will present a joint paper describing the electrical installation of the strip mills.

A competitive examination for research engineer who will be given \$3,000 to \$3,600 salary per annum is announced by the United States Civil Service Commission. One vacancy exists at the Watertown Arsenal, Watertown, Mass. Applicants should apply for form 2118 from the commission's headquarters at Washington, D. C., or at the Federal buildings in the leading cities of the country.

WHEELING STEEL CORPORATION

Consolidation of These Companies With Capital of \$100,000,000

Negotiations, which have been on for several months, looking to a consolidation of all the interests of the Wheeling Steel & Iron Co., the Whitaker-Glessner Co. of Wheeling, W. Va., and the LaBelle Iron Works, Steubenville, Ohio, have progressed satisfactorily and have reached the point where it seems that the consolidation is practically assured. Some facts concerning the plans and operations of these companies were given in THE IRON AGE of June 3, page 1633. The most recent action taken was a decision by the boards of directors of the three companies in favor of their consolidation. Meetings of the stockholders of the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co. will be held late this month, and of the LaBelle Iron Works on July 2, for the purpose of ratifying the plans for the consolidation. There seems to be no doubt that the stockholders will approve the action of the directors.

It is proposed to have a holding company to be known as the Wheeling Steel Corporation, which will be incorporated under the laws of Delaware, with a capital of \$100,000,000, of which \$30,000,000 will be preferred stock and \$70,000,000 common stock. For the present only \$24,000,000 preferred and \$40,000,000 common stock will be issued, the remainder to stay in the treasury and to be issued as needed. It is probable that the new interest will make large additions and improvements to the plants of the three companies, announcement of which will be made shortly.

The present capacity of the various plants is approximately 1,000,000 tons of steel ingots per year. The LaBelle Iron Works capacity at Steubenville, Ohio, is 420,000 tons per year, there being eleven 65-ton basic open hearth furnaces. At Portsmouth, Ohio, the Whitaker-Glessner Co. has an ingot capacity of 350,000 tons per year from ten 60-ton basic open hearth furnaces. The Wheeling Steel & Iron Co. has at Wheeling two 6-ton Bessemer converters with an annual capacity of 225,000 tons of ingots.

As yet no official statement has been made as to the presidency of the new company or as to other officials. The merger is expected to result in many economies in operation. It is the outgrowth of attempts made at intervals in the past ten years to merge the LaBelle Iron Works and the Wheeling Steel & Iron Co.

New Stock Issues

At a meeting of the stockholders of La Belle Iron Works to be held at Steubenville, Ohio, July 2, there will be an increase in the capital stock from \$20,000,000 to \$27,000,000 and a dividend will be declared of 66 2/3 per cent, holders to have the privilege of exchanging their stock, share for share. The Wheeling Steel & Iron Co. will authorize a stock increase from \$10,000,000 to \$14,000,000 and declare a dividend of 45 per cent. Stock exchanges can be made in the approximate ratio of three-eighths share of preferred and five-eighths share of common for each share held. The Whitaker-Glessner Co. will declare a dividend of 17 per cent and stock exchanges can be made at the approximate ratio of one-third preferred and two-thirds common.

Considered together, the value of the shipments of the three companies for the year 1919 was in excess of \$64,000,000; total income was over \$11,500,000; net earnings before dividends, \$7,577,480.71. The principal combined tonnages produced for the year were: Pig iron, 462,357 tons; ingots, 697,253 tons; finished products, 679,253 tons; iron ore, 886,033 tons; coal, 804,505 tons; coke (by-product) 351,333 tons; tar, 4,228,879 gallons; benzol, 1,015,037 gallons; petroleum, 4328 barrels.

The outstanding capital stock (\$100 par) of La

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Belle Iron Works, Wheeling Steel & Iron Co. and the Whitaker-Glessner Co. at the close of 1919 as shown by statements issued, aggregated \$24,307,230. Based upon outstanding shares, the net surplus available per share was approximately \$145.

Higher Freight Rates Favored

WASHINGTON, June 15.—Hearings on the question of an increase in freight rates as a means of bringing the revenues of the railroads up to a point making possible the guaranteed rate of earnings have been continued before the Interstate Commerce Commission throughout the past week.

The railroads received support from several representatives of shippers' organizations.

C. L. Lingo, traffic manager of the Inland Steel Co., and representing the Illinois Manufacturers' Association, urged that the commission allow the maximum increase of rates permitted under the new transportation act, in order to enable the roads to give adequate service.

R. M. Field of Peoria, Ill., representing the National Industrial Traffic League, composed of many shippers in all parts of the country, favored such an increase in rates as would yield sufficient revenue for the complete rehabilitation of the roads.

Iron and Steel Markets

DEPENDENCE ON FUEL

Basic Factor to Sustain Improvement

Higher Pig Iron and Coke—Steel Output So Far at 41,400,000 Ton Rate

Steel production keeps up at a higher rate than the very moderate betterment in car movement would indicate. No signs appear that any marked change is impending in the relation of output and consumption and the week has brought an actual advance of 50 cents in basic pig iron, while coke is \$1 a ton higher.

It is to be expected that the gorge of finished material at various mills will be broken as the railroads keep working on it, but for many weeks coal and coke supply will be the key to the whole iron and steel situation. In the past week hot weather and the breaking in of so many new railroad workers have shown that a trying summer is ahead.

The May output of steel ingots, partly estimated, was about 3,430,000 tons, a gain of 10 per cent from April, and the industry was surprised that the total for the past five months was at a yearly rate of 41,400,000 tons, pointing to the possibility that 1920 may yet be one of the three great years in steel.

Consumers who are wrestling with the most difficult situation in all their experience are still puzzled by the large production figures and the smallness of the visible supply of finished steel of nearly all descriptions.

There are further sales here and there of plates, structural steel and sheets at prices quite a little below the scarcity peaks of the year. At Cleveland 3.75c. on plates has succeeded 4c., and some outside mills have sold there at 3.50c., Pittsburgh.

With all the firmness of bars and the maintenance of 4c. by some sellers, a Pittsburgh mill has been taking orders at 3c. for rather early delivery.

Cotton ties have been sold freely by the leading interest at \$2 per bundle, Pittsburgh, but independent producers, whose prices are presumably higher, have not figured in the market as yet.

The Elgin, Joliet & Eastern Railroad is inquiring for 2000 to 2500 cars and the Illinois Central is in the market for 300 stock cars and is expected shortly to close on 1000 refrigerator cars and 200 flat cars. The car shortage has brought out a good crop of orders from iron and steel and coke producers who see the need of looking out for themselves. Already these companies have placed nearly 2500 cars and good-sized inquiries are pending.

A court house for New York, taking 9000 tons, is conspicuous in the present dearth of projects for the fabricating steel trade.

Cancellations of Japanese business are apparently swelling in volume, but many American sellers as yet find no reason to accept them. Failure to renew satisfactory credits may prove the determining factor. There is little disturbance, as the Dutch East Indies and even Europe have absorbed most of the rejections.

Activity in the pig iron market has been confined almost entirely to basic at Pittsburgh and

a fair tonnage sold for export, the latter including 5000 tons of Southern iron for Glasgow and several thousand tons of Bessemer. Foreign melters are willing to pay full domestic prices, but insist upon prompt delivery. Following the sales of a considerable tonnage of basic at \$43.50, Valley furnace, sales of several thousand tons were made at \$44 and it seems probable that the basic price will advance still further on account of the scarcity of this grade and the active demand.

Slowness in the delivery of coke and its very high price have caused embarrassment to numerous furnaces and unless deliveries improve several will become inactive at an early date. Both furnace and foundry cokes have advanced at least \$1 per ton and some sales have been made at still higher prices.

The latest addition to the country's blast furnaces, that of the Ford Motor Co., is offering to sell high silicon iron and has made sales on the basis of \$44 for 1.75 to 2.25 silicon.

Shipments of ore from Lake Erie ports to June 1 were 479,000 tons less than the total for the same period last year, or only about a 10 per cent falling off, which was much less than expected. Remaining on docks on June 1 was 6,312,575 tons, or 368,000 tons more than a year ago.

Recent transactions indicate that the imports of Indian manganese ore to this country will increase considerably in the second half of the year. The first manganese from the Caucasus since 1914 recently reached England at a price close to £12 per ton.

A hitch in negotiations with sheet and tin plate workers over meeting wage rate advances of over 25 per cent in some instances carries threats of more so-called vacations of the workers.

Pittsburgh

PITTSBURGH, June 15.

The local railroad situation is slowly but steadily getting better, the improvement not being as great as the statements of the railroad officials would indicate, nor is the improvement as fast as the railroad officials promised it would be when the men started to go back to work. The very hot weather of the past week has been against the railroads, as the new men are unable to stand the heat and cannot do as much work as the old men. The last report from the Pennsylvania states that it is nearly back to normal, all its yards being in good shape except the Conway yards, which are very badly congested. On Monday, June 14, the Pennsylvania moved in the central region, between Altoona, Pa., and Crestline, Ohio, 59,125 loaded cars, the best movement in any one day since April 6. On the previous day, about 55,000 cars were moved, and the day before, 54,000 cars. On the Pittsburgh & Lake Erie, the last report shows this road to be almost at a standstill, officials stating that the extremely hot weather has operated very much against them. The Baltimore & Ohio is about normal but the Erie and New York Central are practically the same as last week. The great trouble is the shortage in the supply of empty cars, but this may be helped to some extent by a ruling that went into effect Sunday, June 13, by which coal producers are required to secure permits from the railroads for cars to upper Lake ports.

There is decided activity in the inquiry for basic iron, prices having advanced squarely to \$44, Valley

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton: June 15, June 8, May 18, June 17.

	1920	1920	1920	1919
No. 2 X, Philadelphia	\$47.15	\$47.15	\$47.15	\$29.50
No. 2, Valley furnace	45.00	45.00	45.00	26.75
No. 2, Southern, Cin'tit.	45.60	45.60	45.60	28.35
No. 2, Birmingham, Ala.	42.00	42.00	42.00	24.75
No. 2, furnace, Chicago*	43.00	43.00	43.00	26.75
Basic, del'd, East Pa.	44.80	44.80	44.80	25.50
Basic, Valley furnace	44.00	43.50	43.50	25.75
Bessemer, Pittsburgh	44.40	44.40	43.90	29.35
Malleable, Chicago*	43.50	43.50	43.50	27.25
Malleable, Valley	44.00	44.00	44.00	27.25
Gray forge, Pittsburgh	43.40	43.40	43.40	27.15
L. S. charcoal, Chicago	57.50	57.50	57.50	38.85

Rails, Billets, Etc., Per Gross Ton:

	June 15	June 8	May 18	June 17
Bess. rails, heavy at mill	\$55.00	\$55.00	\$55.00	\$45.00
O-h. rails, heavy, at mill	57.00	57.00	57.00	47.00
Bess. billets, Pittsburgh	60.00	60.00	60.00	38.50
O-h. billets, Pittsburgh	60.00	60.00	60.00	38.50
O-h. sheet bars, P'gh.	80.00	80.00	80.00	42.00
Forging billets, base P'gh.	85.00	85.00	80.00	51.00
O-h. billets, Philadelphia	64.10	64.10	64.10	42.50
Wire rods, Pittsburgh	75.00	75.00	75.00	52.00

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	4.25	4.25	4.25	2.595
Iron bars, Pittsburgh	4.25	4.25	4.25	2.35
Iron bars, Chicago	3.75	3.75	3.75	2.50
Steel bars, Pittsburgh	3.50	3.50	3.50	2.35
Steel bars, New York	4.02	4.02	4.02	2.62
Tank plates, Pittsburgh	3.50	3.50	3.75	2.65
Tank plates, New York	3.77	3.77	4.02	2.92
Beams, etc., Pittsburgh	3.10	3.10	3.10	2.45
Beams, etc., New York	3.27	3.27	3.27	2.72
Skelp, grooved steel, P'gh.	2.75	2.75	2.75	2.45
Skelp, sheared steel, P'gh.	3.00	3.00	3.00	2.65
Steel hoops, Pittsburgh	5.00	5.00	5.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers: June 15, June 8, May 18, June 17.

	1920	1920	1920	1919
Sheets, black, No. 28, P'gh.	5.50	5.50	5.50	4.35
Sheets, galv., No. 28, P'gh.	7.00	7.00	7.00	5.70
Sheets, blue an'l'd, 9 & 10.	4.50	4.50	4.50	3.55
Wire nails, Pittsburgh	4.00	4.00	4.00	3.25
Plain wire, Pittsburgh	3.50	3.50	3.50	3.00
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.10
Tin plate, 100-lb. box, P'gh.	\$7.00	\$7.00	\$7.00	\$7.00

Old Material, Per Gross Ton:

	June 15	June 8	May 18	June 17
Carwheels, Chicago	\$35.50	\$35.50	\$37.00	\$22.50
Carwheels, Philadelphia	38.00	38.00	40.00	23.00
Heavy steel scrap, P'gh.	25.00	25.00	25.00	17.50
Heavy steel scrap, Phila.	22.50	22.50	23.00	16.00
Heavy steel scrap, Ch'go	22.50	22.00	22.50	17.00
No. 1 cast, Pittsburgh	32.00	32.00	32.00	19.00
No. 1 cast, Philadelphia	37.00	37.00	38.00	22.00
No. 1 cast, Ch'go (net ton)	35.50	35.50	36.50	21.00
No. 1 RR. wrot, Phila.	33.00	33.00	33.00	21.00
No. 1 RR. wrot, Ch'go (net)	25.00	25.00	26.00	17.00

Coke, Connellsville,

Per Net Ton at Oven:				
Furnace coke, prompt	\$15.00	\$14.00	\$12.00	\$4.00
Furnace coke, future	15.00	14.00	12.00	4.00
Foundry coke, prompt	16.00	15.00	13.00	4.50
Foundry coke, future	16.00	15.00	13.00	6.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	19.00	19.00	19.00	18.25
Electrolytic copper, N. Y.	19.00	19.00	19.00	18.00
Zinc, St. Louis	7.55	7.75	7.70	6.50
Zinc, New York	7.90	8.10	8.05	6.85
Lead, St. Louis	8.50	8.50	8.15	5.10
Lead, New York	8.75	8.75	8.50	5.35
Tin, New York	45.50	49.25	54.75	72.50
Antimony (Asiatic), N. Y.	7.87 1/2	8.75	9.75	8.37 1/2

All prices in above tables are for domestic delivery and do not necessarily apply to export business.

furnace, and there has also been a decided spurt in prices on prompt furnace coke, which it is reported has sold at \$16 per net ton at oven, but the general market is regarded as about \$15 at oven. Delivery of coke by the railroads to blast furnaces in the past week has been worse than at any time for three or four weeks, and some furnaces will go down this week until the coke situation improves. The Shenango Furnace Co. will blow out a stack and the We'reton Steel Co. furnace will likely go out this week for the same reason. It is likely two or three other stacks that have about reached the end of their coke supply will bank or go out in the next week. One prominent coke operator states that last week the average car supply at its works was slightly less than 10 per cent.

Business in finished steel has fallen off considerably, but this is not causing any anxiety to the mills, as under the present unsatisfactory operating conditions, they have about all the obligations on their books they care to assume. The Carnegie Steel Co. is said to have close to 500,000 tons of finished steel products piled ready for shipment, the Jones & Laughlin Steel Co. has at least 100,000 tons, the American Sheet & Tin Plate Co. 91,000 tons, and other smaller steel interests have heavy stocks which they are unable to move on account of the shortage in empty cars. Prices are steady and basic iron is up 50c. a ton and furnace and foundry coke at least \$1 a ton.

Pig Iron.—Prices on basic iron have advanced squarely to \$44 per gross ton at Valley furnace, one sale of 2000 tons and several other sales having been made at that figure. Last week there were heavy sales of

basic iron at \$43.50, Valley furnace, one local open-hearth steel interest having bought 7000 tons at that price, but sellers are now standing firm for \$44 at furnace, and that seems to be the minimum of the market. Small sales of No. 2 foundry iron for prompt delivery are being made at \$45 at Valley furnace and inquiry is fairly active. Very little is being done in Bessemer except for export, inquiry for which is active. Further sales of 2000 to 3000 tons of standard Bessemer iron have been sold for export at \$45, Valley furnace, but for domestic purposes \$43, Valley furnace, is still being quoted. Prices on all grades of pig iron are firm, and predictions are made that basic iron, owing to its scarcity and the active demand, will soon go to \$45, or higher.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being \$1.40 per gross ton:

Basic	.....	\$44.00
Bessemer	.....	43.00
Gray forge	.....	42.00
No. 2 foundry	.....	45.00
No. 3 foundry	.....	43.50
Malleable	.....	44.00

Billets and Sheet Bars.—Several inquiries are in the market for sheet bars for automobile builders, who desire to buy and then have the bars rolled into sheets for automobile uses on a conversion cost. One local steel interest has been a free seller of sheet bars for this purpose for some time, and is credited with having sold in the past week 4000 to 6000 tons at either \$80 or \$85 at mill, for fairly prompt shipment. Shipments of billets and sheet bars to mills in this district are getting better, owing to the improved railroad condi-

tions. Prices are firm, but it is believed the market on billets and sheet bars has reached the top.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at \$38 to \$60; 2 x 2-in. billets, \$42; Bessemer sheet bars, \$42 to \$65; open-hearth sheet bars, \$42 to \$75, and forging billets, ordinary carbons, \$85 to \$90 base, all f.o.b. Youngstown or Pittsburgh mill.

Ferroalloys.—The local market is very quiet, inquiry being confined to an occasional carload of ferromanganese for prompt shipment. Prices on this material for prompt delivery are easier, and it is probable \$225 could be done on a firm offer, while the market for last half of the year is strong at \$200, delivered. Very little is being done in ferrosilicon or spiegeleisen, and consumers of the lower grades of ferrosilicon and silvery iron seem to be well covered.

We quote 76 to 80 per cent domestic ferromanganese \$200 for last half and \$230 to \$240 for prompt delivery, with a reduction of \$1.50 to \$1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at \$80 to \$85 and 18 to 22 per cent spiegeleisen at \$70 to \$75, furnace. Prices on Bessemer ferrosilicon are: 9 per cent, \$56.50; 10 per cent, \$59.50; 11 per cent, \$62.50; 12 per cent, \$66.10. We quote 6 per cent silvery iron, \$48.25 to \$48.75; 7 per cent, \$52.50 to \$53; 8 per cent, \$54.50 to \$55; 9 per cent, \$56.50 to \$57, and 10 per cent, \$59 to \$59.50. An advance of \$3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of \$2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. makers' furnace, Jackson or New Straitsville, Ohio, which has a uniform freight rate of \$2.90 per gross ton for delivery in the Pittsburgh district.

Structural Material.—Local fabricators report inquiry to be lighter than at any time in the past year. Very little new work is being placed and not much is in sight. The reason for this is found in the railroad situation, which is causing great delay in delivery of steel, and in the high prices and arbitrary methods of labor. The Joseph Horne Co., this city, which contemplated building a large addition to its store, involving 3000 to 4000 tons, has called the project off, and other small projects are also held up. Work is getting slack among the structural mills, but deliveries on old contracts are very bad, owing to the railroad congestion. The Carnegie Steel Co. still quotes beams and channels up to 15 in. at 2.45c., while the other local fabricator still quotes 2.90c. to 3.25c., its prices depending on the quantity, the delivery and whether the buyer is a regular customer.

Plates.—The steel companies and also some of the coal and coke producers have decided that the only way in which they can be assured of a supply of cars is to have their own, and for this reason some steel companies are placing orders for steel cars, as are also some of the coal and coke interests. The Koppers Co. has placed an order with the Standard Steel Car Co. for 900 55-ton steel hoppers and 100 70-ton steel hoppers. The Weirton Steel Co. has placed an order for 240 70-ton steel hoppers with the Standard Steel Car Co., the cars to be owned jointly by the Weirton Steel Co. and the Redstone Coal & Coke Co. The Youngstown Sheet & Tube Co. has ordered 500 steel hoppers to be built by the Cambria Steel Co., Johnstown, Pa. The Standard Steel Car Co. has also taken 300 flat and 75 ballast cars for the Havana Central Railroad, Cuba. The Pennsylvania Tank Car Co. has taken 200 tank cars and the McKinney Steel Co. has ordered 500 70-ton steel hoppers from the Standard Steel Car Co. Local companies report they have large inquiries for steel cars from other steel, coal and coke interests, some of which are likely to be placed within a short time. The general demand for plates is getting more active, some of the shipbuilding interests being in the market with heavy inquiries. One eastern shipbuilding company has an inquiry here for 25,000 tons of plates and small shapes which it will likely place in a short time.

We quote sheared plates of tank quality, $\frac{1}{4}$ -in. and heavier, at 2.65c. to 3c. for very indefinite delivery, while prices on $\frac{1}{4}$ -in. and heavier plates, named by mills that will agree to ship out in three to four months, is 3.50c.

Sheets.—Operations among the sheet mills of the American Sheet & Tin Plate Co. and the independent interests are showing some betterment, due to the

slightly improved railroad conditions, but there is still a very serious shortage in the supply of empty cars, and this is likely to last, to greater or less extent, over most of this year. The demand for sheets is not as urgent as some time ago, especially from the automobile builders, but most leading mills are well sold up for the remainder of this year. Prices quoted by some of the larger independent sheet mills are now getting close to those of the leading interests.

We quote No. 28 gage box annealed one-pass black sheets at 4.35c. to 6.50c.; No. 28 galvanized, 5.70c. to 8.50c., and Nos. 9 ad 10 blue annealed at 3.55c. to 6c., the lower prices named being the March 21 schedules, which are still named by the leading interests, while the higher prices represent a fair range of quotations by the independent mills.

Tin Plate.—The preference order issued by the car service section of the American Railway Association, which expired on June 12, has been extended for two weeks, on the urgent solicitation of tin plate and can makers. During the two weeks ending June 12, in which this order was in force, the heavy stocks of tin plate piled in warehouses and loaded on cars were reduced to a considerable extent, and will be very much further reduced in the two weeks ending June 26, but in many cases the supplying of empty cars to the tin plate mills has been done at the expense of the sheet mills which report a greater shortage in the supply of cars than at any time since the railroad strike started. The American Sheet & Tin Plate Co. has reduced considerably its heavy stock of tin plate, the Jones & Laughlin Steel Co. cut down its stocks from about 300,000 boxes to nearly 150,000 boxes, and the McKeesport Tin Plate Co. also made heavy reductions in its stocks, so that there has been real improvement in shipments by the tin plate mills. There is some export inquiry, mostly from the Orient and South America, and some New York exporters that have tin plate sold for export to Japan, but who were afraid of financial conditions in that country, have resold this tin plate to domestic consumers, who were glad to get it and paid in some cases as high as \$10 per base box for it. The domestic demand is very dull, as consumers are covered for this year and the mills are giving all their efforts now to getting out shipments.

We now quote tin plate to domestic consumers for remainder of the year delivery at \$7 to 8.50 base box, stock items \$9, and for export \$11 to \$12 per base box, all f.o.b. Pittsburgh.

Steel Rails.—The demand for light rails is fairly active and a good part of the new business being placed is going to the rerolling mills which reroll light rails. No orders are being placed for standard sections, and on these the Carnegie Steel Co. and the Cambria Steel Co. are reported to be sold up for this year.

The Carnegie Steel Co. is still quoting the March 21, 1919, prices, these being 2.45c. for 25 to 45-lb. sections, 2.49 $\frac{1}{2}$ c. for 16-lb. and 20-lb. sections, 2.54c. for 12-lb. and 14-lb. sections, and 2.58 $\frac{1}{2}$ c. for 8-lb. and 10-lb. sections. This company is also quoting standard sections 50 lb. and heavier at \$45 for Bessemer and \$47 for open hearth stock. The Cambria Steel Co. is quoting 25-lb. to 45-lb. sections at 3.75c., 16-lb. and 20-lb. sections, 3.79 $\frac{1}{2}$ c., and 12-lb., 3.84c. at mill, for such delivery as it can make.

Wire Rods.—Local makers report the inquiry very active, but say they have sold about all the rods they care to sell over third quarter. One interest sold last week 1000 tons of soft Bessemer rods at \$75 per gross ton at mill. Another interest has over 20,000 tons of rods piled up in its yards or loaded on cars ready for shipment to consumers as soon as they can be moved. We quote soft Bessemer and open hearth rods at \$75, screw stock rods, \$80 to \$85, and high carbon rods, \$85 to \$100, prices on the latter depending entirely on the carbon content.

Wire Products.—Local makers are not selling wire or wire nails very actively, in fact, have instructed their sales managers not to submit inquiries unless from regular customers, as they have all the orders for wire and wire nails they can take care of over third quarter. Some export sales of wire nails are being made at \$5.75 to \$6 base, galvanized barbed wire at 6c. to 6.25c., and galvanized wire at 5.50c. to 5.75c. at mill. Very heavy stocks of wire and wire nails are piled, owing to the railroad strike, and it will be several months be-

fore these are moved. Prices on wire products are given in detail on page 1763.

We quote wire nails at \$3.25 base, this being the price of the American Steel & Wire Co., and \$4 base on the new card recently issued by four or five of the independent mills. We quote bright basic wire at \$3, this being the price of the American Steel & Wire Co., and \$3.50, this being the price of most of the independent mills.

Iron and Steel Bars.—Mills rolling iron or steel bars report that the demand is not so urgent as some time ago, and shipments are still greatly delayed by the shortage in empty cars. The demand for reinforcing steel bars has also fallen off, owing to the general slump in new building operations.

We quote steel bars rolled from billets at 2.35c., this being the price of the Carnegie Steel Co. for very indefinite delivery, likely not before first quarter of next year. Other mills rolling steel bars from billets quote from 3c. to 3.50c. at mill, prices depending entirely on the buyer and the delivery wanted. The demand for concrete reinforcing steel bars is fairly active, and we quote these, when rolled from billets, at 4c. to 4.25c., and from old steel rails at about 3.50c. at mill. We quote common iron bars at 4.25c. to 4.50c. and refined iron bars at 4.50c. to 5c. in carloads, f.o.b. mill, Pittsburgh.

Cotton Ties.—The Carnegie Steel Co. has sold freely of cotton ties for this season's delivery at \$2 per bundle of 45 lb., f.o.b. at mill. The Pittsburgh Steel Co. has not yet started to roll cotton ties and will likely not name its price until it is about ready to make shipments.

Cold-Rolled Steel Bars.—A leading local maker reports that almost its entire output of cold-rolled steel bars since late in April has been shipped by truck. It received and delivered in May over 13,000 tons of steel, all by truck, and paid tolls on one bridge in May of nearly \$1,100. The demand for cold-rolled steel bars is not so urgent, but makers are sold up for three or four months, and report deliveries very bad, as it is almost impossible to get empty cars. We quote cold-rolled steel bars at \$4.10 to \$4.25 per 100 lb. at mill, to regular customers. Premium prices asked by a few of the smaller makers range from 5c. to 6c. per lb. at mill.

Cold-Rolled Strip Steel.—Two of the leading local makers are still quoting cold-rolled strips at 8½c. per lb. at mill, second half of the year at this price. Premium prices are largely disappearing, but occasionally as high as 10c. to 12c. per lb. is quoted for prompt delivery.

Hot-Rolled Strip Steel.—The demand is not nearly so urgent as some time ago, but local makers say they have all the orders they can turn over the next three months. Two leading local makers are holding hot-rolled strips firm at 5½c. per lb. at mill to regular customers. Premium prices are not so common as they were, these ranging in some cases from 6c. to 8c. per lb. at mills for small lots.

Nuts, Bolts and Rivets.—Last week a leading local maker of nuts and bolts put out a new list of discounts in which prices on most grades were advanced about 10 per cent. One other local maker has not yet advanced its prices but may do so soon. The revised discounts on nuts and bolts, and also the higher prices on small rivets are given in detail on page 1763.

Spikes.—The demand for standard railroad spikes has been more active recently than for some time. The Atlantic Coast Line has placed 4200 kegs with a local maker, and the Missouri Pacific has an inquiry out for 4000 kegs. The demand for small spikes and boat spikes is also reported active, and two local makers say they are filled up over the next three months or longer.

We quote standard spikes, ¼ to 9/16 in. and larger, \$4 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ½ in. and 7/16 in., \$4.50; 5/16 in., \$5.00; boat and barge spikes, \$4.25 f.o.b. Pittsburgh. Tie plates \$3 to \$4 per 100 lb.

Hoops and Bands.—The Carnegie Steel Co. is still quoting 3.05c. on hoops and bands, these being the prices agreed upon March 21 last year, with usual extras, while another local maker has been selling hoops and bands for some time on the basis of 5.50c. at mill, and reports being able to take all the orders it cares to at this price.

Iron and Steel Pipe.—While the demand for tubular goods is not so urgent as some time ago, yet the mills are turning away offered business every day on which they cannot make delivery. The scarcity of empty cars

is curtailing output in this district to some extent. Last Friday the National Tube Co. shut down its Pennsylvania works in this city, as it has 21,000 tons of tubular goods piled around this plant and on cars, and was simply unable to operate any longer. Two of the five furnaces in the plant were started on Tuesday morning and it is hoped to have the entire mill going before this week ends.

Coke.—Car supply in the coke regions was worse last week than at any time since the railroad strike started. Some large coke works received only 10 to 20 per cent of the usual supply of cars, and the outlook for this week is not much better. A leading blast furnace interest has made a contract for upward of 25,000 tons of coke per month for last half of the year, on a four-to-one basis, that is, four tons of coke for a ton of basic iron. At the present price of basic iron, which is \$44, Valley furnace, this contract would net the coke producer \$11, but the contract contains a minimum price of \$6 and a maximum price of \$10, so that the advantage in the contract for the present is with the consumer. It is stated, but not confirmed, that contracts for blast furnace coke for eastern consumers have been made for \$12 per net ton at oven, for delivery over last half of this year. There has been a spurt in prices on furnace coke for prompt shipment and sales of considerable tonnage have been made at \$15 up to \$16, at oven, but the lower price is regarded as being the average market price. Some of the smaller independent coke producers say they will not make any contracts for last half delivery and will sell their coke from day to day in the open market. Output of coke in the upper and lower Connellsburg regions last week was 189,580 net tons, a gain over the previous week of nearly 4000 tons. We now quote standard makes of blast furnace coke for spot shipment at \$15 to \$16, and 72-hr. foundry at \$16 to \$17 per net ton at oven.

Old Material.—In the past week or so three or four local consumers have bought about 10,000 tons of selected heavy steel melting scrap, for which they paid \$26 per gross ton, delivered. These are the first sales of moment of scrap, that have been made in this market for some weeks, but it is believed at least two of these concerns bought scrap largely in order that they could have the use of the cars after they were unloaded. Nearly all consumers of scrap in this district still have a good deal of material due them on contracts they placed some time ago, on which deliveries have been held up on account of the railroad strike. However, scrap is now going into consumers at a better rate than for some time, owing to improved railroad conditions, but it will take several months at least before all deliveries on old contracts have been made. For this reason it is not likely that prices on scrap, especially for open-hearth purposes, will show much advance in prices for some time, as these consumers are not likely to buy very much more scrap until they get what is still due them. There is practically no activity in other grades of scrap, but prices are holding fairly strong.

We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	\$25.00 to \$25.50
No. 1 cast for steel plants	34.00 to 35.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh	32.00 to 33.00
Compressed steel	22.00 to 22.50
Bundled, sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	16.00 to 16.50
Bundled, sheet stamping	15.00 to 15.50
No. 1 busheling	17.50 to 18.00
Railroad grade bars	26.00 to 26.50
Low phos. melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	30.00 to 30.50
Railroad malleable	30.00 to 30.50
Iron car axles	37.00 to 38.00
Locomotive axles, steel	34.00 to 35.00
Steel car axles	31.00 to 32.00
Cast iron wheels	40.00 to 41.00
Rolled steel wheels	29.00 to 30.00
Machine-shop turnings	15.00 to 15.50
Sheet bar crop ends (at origin)	28.00 to 28.50
Heavy steel axle turnings	20.00 to 21.00
Heavy breakable cast	32.00 to 32.50
Cast iron borings	17.00 to 17.50
No. 1 railroad wrought	31.00 to 32.00

Chicago

CHICAGO, June 15.

A quiet market prevails in practically all iron and steel lines. With such exceptions as bars and sheets, there is comparatively little demand from consumers, but there is considerable pressure for shipments on unfilled orders. The leading interest is making unsatisfactory progress in meeting its delivery promises, owing to inability to get cars. At Steel Corporation plants in the Chicago district, at least 100,000 tons of steel is piled awaiting shipment. Smaller industries are having less difficulty. The railroad situation has shown improvement in spots, but on the whole it is still very far from normal. Steel plant operations are for the most part being carried on from hand to mouth. Incoming shipments of raw materials, particularly fuel, are insufficient and undependable. Some steel companies have a part of their sales forces at work scouting for coal, but even this tracing is not bringing desired results. On Monday the leading interest had 21 out of 29 blast furnaces in blast, but its supply of fuel was so short that it was expected that three furnaces might be banked at any time. While steel business is not active, the leading interest is putting more tonnage on its books than it is shipping. The statement showing a substantial gain in unfilled tonnage as of June 1 is a reflection of the inability to ship rather than indicating an improvement in the volume of current orders.

Pig Iron.—The market is dull except that there is a fair demand for spot foundry iron. There is practically no buying for forward delivery. Makers of Northern foundry iron have little, if any, iron to offer for shipment this year, but one of the Ford furnaces, at River Rouge, Mich., is now in blast and has offered some high silicon iron for prompt shipment. Sales of this furnace's product have been sold on the basis of \$44, furnace, for the 1.75 to 2.25 per cent silicon grade. Most of the spot iron being sold is for shipment from Alabama or Virginia furnaces, the former adhering generally to the base price of \$42, Birmingham, while Virginia iron is being sold at around \$44 furnace. Steel making grades are inactive.

The following quotations are for iron delivered, at consumers' yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, averaging sil.	
1.50 (other grades subject to usual differentials), deliv. at Chicago	\$57.50
Northern coke, No. 1, sil. 2.25 to 2.75	45.25
Northern coke foundry, No. 2, sil.	
1.75 to 2.25	43.00
Northern high phos. foundry	43.00
Southern coke No. 1 foundry and	
No. 1 soft sil. 2.75 to 3.25	50.20
Southern coke No. 2 foundry sil.	
2.25 to 2.75	48.70
Southern foundry sil. 1.75 to 2.25	47.00
Malleable not over 2.25 sil.	43.50
Basic	42.00
Low phos. (copper free)	54.00
Silvery, 7 per cent	\$56.40 to 59.80

Ferroalloys.—The market is slow, but occasional sales of ferromanganese for spot delivery are being made at \$235 to \$250, delivered, but on July-August shipment, \$225 to \$230 are producers' quotations. For delivery over the entire last half, the price generally quoted is \$200. Spiegeleisen is quiet.

We quote 75 to 80 per cent ferromanganese, all of last half, delivered, \$200; part of last half, \$225; spot, delivered, \$235; 50 per cent ferrosilicon at \$85 delivered; spiegeleisen, 18 to 22 per cent, \$70 to \$75 furnace.

Railroad Rolling Stock.—The Elgin, Joliet & Eastern Railroad is in the market for 1500 all-steel side-dump cars, 70 tons capacity, and 500 to 1000 composite gondola cars. The Illinois Central Railroad has inquired for 300 live stock cars, 40 tons capacity, and is expected to close this week for 1000 refrigerator cars and 200 flat cars. The equipment companies have had no definite advices as yet regarding the manner in which the \$75,000,000 made available by the Government for freight cars will be expended.

Plates.—Conditions in the plate market are about the same as have prevailed in the last few weeks. There is little demand from consumers. The leading interest and the leading independents continue to book

some new business, the former at 2.65c., Pittsburgh, and the latter at 3.77c., mill. Railroads have been expected to come into the market for car repair material, but so far there has been little of this tonnage placed. Universal plates are offered by some mills, but there is little demand owing to the inactive building market.

The mill quotation is 2.65c. to 4c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 4.17c. for plates out of stock.

Bars.—There continues to be a good demand for steel bars, and some orders are being taken by Eastern mills at 4c. and higher when reasonably early delivery can be assured. Rail carbon steel mills are heavily booked, and the best that can be done on deliveries is three to four months. The demand for bar iron is also fairly active. Prices are firm and without change.

Mill prices are: Mild steel bars, 2.35c. to 4c., Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.75c. to 4c., Chicago; rail carbon, 3.75c., mill.

Jobbers quote 3.87c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.80c. for rounds and 6.30c. for flats and squares, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra 35c. for orders up to 1000 lb.

Structural Material.—There is so little building work in prospect that mills are offering shapes at easier prices, 3.10c. to 3.25c., Pittsburgh, being readily quoted by independents, while 3c. is said to have been done in some instances. The John Obenberger Forge Co., Milwaukee, is in the market for a 230-ton addition to forge works and steel storage building, bids closing June 16. The Heil Co., Milwaukee, is taking bids on 250 tons for an addition to a steam dump body shop. The Birmingham Steel Co., Birmingham, Ala., has been awarded 700 tons by Swift & Co. for a fertilizer plant at La Grange, Ga.

The mill quotation is 2.45c. to 4c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.97c. for materials out of warehouse.

Hoops and Bands.—Chicago jobbers have advanced prices on hoops and bands out of stock to 5.82c. for bands and 6.57c. on hoops, an increase of 75c. per 100 lb.

Sheets.—While the high premiums obtainable recently for sheets are not now so readily offered by consumers, there is still a strong demand. The market, however, is devoid of new features.

Mill quotations are 4.35c. to 6.50c. for No. 28 black; 3.55c. to 6c. for No. 10 blue annealed, and 5.70c. to 8.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. The lowest prices are those of March 21.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 7.02c.; No. 28 black, 8c.; No. 28 galvanized, 9.50c.

Wire Products.—Shipments by the leading interests are now about keeping pace with production. While some of the great shortage of wire products, particularly nails, has been relieved, jobbers and retailers are still clamoring for supplies, which fall far short of the requirements of the trade. An Eastern mill is making some sales of small lots of wire nails at 4c. for nearby shipment, but the leading interest is putting business on its books at 3.20c. per lb. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1763.

Cast Iron Pipe.—Municipal inquiries are few because of the inability of municipalities to float their bonds. Detroit is taking bids this week on 7000 tons of 8, 16 and 24-in. water pipe. Prices are firm and some interests are quoting above the quotations named below.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., \$79.80; 6-in. and above, \$76.80; class A and gas pipe, \$2 extra.

Rails and Track Supplies.—Railroads are beginning to inquire for rails for 1921, but producers are not willing at this time to put orders on their books for that delivery. In this district alone it is estimated that fully 1,000,000 tons have been tentatively inquired for, for next year, while the inquiries throughout the country will total 2,500,000 tons. As the railroads normally require 2,000,000 tons a year for replacement, and as there has been little replacement in the past few years, it is expected that there will be heavy rail

buying for 1921, if adequate financing can be arranged. The roads are buying track supplies in small quantities for urgent work, but in the aggregate such business is not as large as might be expected.

Standard Bessemer rails, \$45 to \$55; open hearth rails, \$47 to \$57. Light rails, 2.45c. to 3.50c. f.o.b. makers' mills.

Standard railroad spikes, 3.55c. to 4c., Pittsburgh. Track bolts with square nuts, 4.90c. to 5c., Pittsburgh. Steel tie plates and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.75c. f.o.b. makers' mills.

Bolts, Nuts and Rivets.—Some of the bolt, nut and rivet manufacturers are now busily engaged in booking contracts for third quarter at the new prices which went into effect early this month. Production is somewhat better, one interest in this district now doing about 70 per cent. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1763.

Jobbers quote structural rivets, 5.37c.; boiler rivets, 5.47c.; machine bolts up to $\frac{3}{8}$ x 4 in., 30 per cent off; larger sizes, 20 off; carriage bolts up to $\frac{3}{8}$ x 6 in., 20 off; larger sizes, 15 off; hot pressed nuts, square tapped and hexagon tapped, 50c. off; coach or lag screws, gimlet points, square heads, 40 per cent off. Quantity extras are unchanged.

Old Material.—The market remains quiet. The recent purchase of steel scrap by the leading interest for its Duluth plant has diverted some scrap, which might otherwise have come into this market, and as a consequence there is a slightly better tone. This is based also on the expectation of dealers that mills in the Chicago district must replenish their stocks before long. We quote some steel-making grades about 50c. a ton higher than a week ago.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$34.00 to \$35.00
Relaying rails	50.00 to 55.00
Car wheels	35.50 to 36.00
Steel rails, rerolling	32.50 to 33.00
Steel rails, less than 3 ft.	25.50 to 26.00
Heavy melting steel	22.50 to 23.00
Frogs, switches and guards, cut apart	22.50 to 23.00
Shoveling steel	22.00 to 22.50
Low phosph. heavy melting steel	26.50 to 27.00
Drop forge flashings	18.50 to 19.00

Per Net Ton	
Iron angles and splice bars	\$30.00 to \$30.50
Steel angle bars	22.00 to 22.50
Iron arch bars and transoms	31.00 to 31.50
Iron car axles	39.50 to 40.00
Steel car axles	33.00 to 33.50
No. 1 busheling	18.00 to 18.50
No. 2 busheling	12.50 to 13.00
Cut forge	22.50 to 23.00
Pipes and flues	15.00 to 15.50
No. 1 railroad wrought	25.00 to 25.50
No. 2 railroad wrought	22.50 to 23.00
Steel knuckles and couplers	22.00 to 22.50
Coil Springs	23.50 to 24.00
No. 1 cast	35.50 to 36.50
Boiler punchings	23.50 to 24.00
Locomotive tires, smooth	22.00 to 22.50
Machine shop turnings	9.00 to 9.50
Cast borings	12.00 to 12.50
Stove plate	27.50 to 28.00
Grate bars	27.50 to 28.00
Brake shoes	24.00 to 24.50
Railroad malleable	25.00 to 25.50
Agricultural malleable	25.00 to 25.50
Country mixed	15.50 to 16.50

Philadelphia

PHILADELPHIA, June 15.

Pervading sentiment in the steel industry in this district is optimistic. The shipping situation improves very slowly. Exporters in this district continue to have their troubles. The longshoremen of Philadelphia are still out on strike, though a conference of opposing factions was held Monday with a view toward arbitration. An embargo against shipments of steel to Baltimore closes that port. There is a fair abundance of export business, the main problem being transportation. Some purchases have been made of steel, originally ordered by Japanese interests, but canceled. The iron and steel for the manufacture of 775 freight cars and 40 passenger cars were recently shipped to South America; also a large tonnage of bolts, spikes and nuts.

The chief sales of pig iron have been those of about 5000 tons of standard low phosphorus at \$52; also 1740 tons to the Norfolk & Western Railroad. Scrap is about \$1 a ton lower on several grades. Several Philadelphia district representatives of finished steel makers attended the convention of the American Railway Association at Atlantic City last week and found there

the opinion that, though the present is dull, the future holds promises of much business in the railroad line at least. Independent plate makers are making the majority of sales at 3.75c., though sales have been noted at as low as 3.25c. where specifications were not particular as to quality of steel and where the mill had in stock the sizes called for.

Pig Iron.—Pig iron remains firm in price, though on several grades sales have not been made recently enough to gage the exact market price. Fewer eastern Pennsylvania furnaces now quote a \$45 base price on foundry iron, \$47 being the majority figure. Nearly all Virginia furnaces are now on a \$45 base, though \$44 iron may be secured from one, and possibly two. The Norfolk & Western Railroad bought 1740 tons of iron from two sellers, dividing the tonnage equally. One-half was malleable and sold for \$46.50, Middle Western furnace. One seller has disposed of a total of about 5000 tons of standard low phosphorus at \$52. Most inquiries are small and for quick delivery.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa., No. 2 X.	2.25 to 2.75 sil.	\$47.15 to \$49.35
East. Pa., No. 2 plain.	1.75 to 2.25 sil.	45.90 to 48.10
Virginia No. 2 plain.	1.75 to 2.25 sil.	49.10
Virginia No. 2 X.	2.25 to 2.75 sil.	50.35
Basic deliv. eastern Pa.		44.80
Gray forge		43.00 to 44.00
Standard low phos. (f.o.b. furnace)		52.00
Malleable		48.10 to 48.60
Copper bearing low phos. (f.o.b. furnace)		47.00

Ferroalloys.—Ferromanganese, prompt, now sells for \$220 to \$225, a reduction of \$20 from a few weeks ago; for future, \$200, delivered, is quoted, with \$195, seaboard, for foreign. Ferrosilicon is rather weak, selling for \$80 instead of the \$85 of a short time ago.

Semi-Finished Steel.—The company which was quoting \$60 for open-hearth rerolling billets is now out of the market, and when it comes in again will ask \$65. Among recent sales are 2500 tons of rerolling billets for \$70; 1000 tons of forging billets at \$85; 200 tons of rerolling billets for \$65. A sale was made of 1500 tons of sheet bars for shipment into the Pittsburgh district. One maker claims to have sold a total of 10,000 tons of wire rods for \$80 within the last two weeks.

Plates.—Those who do not like the term "soft," as applied to the plate market at the present, prefer the term "spotty," admitting that where a western mill might quote 3.50c., an eastern mill might be willing to drop from its 4c. price to meet it. The bulk of independent mill sales have been at 3.75c. Prices do not have to be shaded to obtain export business. One sale of plates was recently made for export through New York at 3.95c. for a tonnage of 1300. One maker reports a heavy demand for sizes $\frac{1}{4}$ in. and lighter, with less demand for heavier sizes, except for export. One inquiry of 18,000 tons of 99 x 5/16 in., various lengths, was reported as coming from Baltimore for a western enterprise. The report also stated, however, that the inquirer had abandoned the inquiry, intending to use wooden pipe. The Sinclair Oil Co. interests have been inquiring for tanks and plates.

Bars.—Though the demand is good, it is not as heavy as it has been recently. A wide range exists in price, quotations having limits of 2.35c. to 5.50c., base, Pittsburgh. Four cents represents the average selling price. Bands are quoted at 5c. One prominent maker of iron bars is asking 4.50c. and explains that it does not need business. Iron bars are being sold freely for export in place of steel bars, in view of the difficulty of securing the latter. It is expected that the western puddlers will get an increase in wages July 1, due to revision based on selling prices, in which case the eastern puddlers will demand as good wages. This will tend to raise costs of manufacturing. A sizable inquiry for rivets was made from the Dutch East Indies.

Rails.—Outside of an inquiry for 1000 tons of rails through a broker, but little activity is noted.

Old Material.—A little more activity in the Pittsburgh district as to scrap may foreshadow improvement in the Philadelphia district. For the present, however, prices are creeping lower. One buyer an-

nounces that when it again comes into the market for borings and turnings for blast furnace use, it will offer \$1 less than its last figure. One company, against which is an embargo for heavy melting steel, may start duplexing, thus doing away with scrap need.

No. 1 heavy melting steel.....	\$22.50 to \$23.00
Steel rails rerolling.....	32.00 to 33.00
No. 1 low phos., heavy 0.04 and under	30.00 to 31.00
Car wheels	38.00 to 40.00
No. 1 railroad wrought.....	33.00 to 34.00
No. 1 yard wrought.....	26.00 to 27.00
No. 1 forge fire.....	17.50 to 18.00
Bundled skeleton	17.50 to 18.00
No. 1 busheling.....	20.00 to 21.00
No. 2 busheling.....	17.00 to 18.00
Turnings (short shoveling grade for blast furnace use)	17.00 to 18.00
Mixed borings and turnings (for blast furnace use)	17.00 to 18.00
Machine-shop turnings (for rolling mill and steel works use)	18.00 to 18.50
Heavy axle turnings (or equivalent)	20.00 to 20.50
Cast borings (for rolling mills)	20.00 to 21.00
Cast borings (for chemical plants)	21.50 to 22.50
No. 1 cast	37.00 to 38.00
Railroad grate bars	31.00 to 33.00
Stove plate (for steel plant use)	27.50 to 28.50
Railroad malleable	28.00 to 29.00
Wrought iron and soft steel pipes and tubes (new specifications)	22.50 to 23.50
Iron car axles.....	45.00 to 46.00
Steel car axles.....	42.00 to 44.00

Boston

BOSTON, June 15.

Pig Iron.—The market the past week has been quiet and steady, with the bulk of sales confined to Southern irons. The barge, 1250 tons Southern, silicon 2.75 to 3.25, offered at Providence, R. I., sold at \$45.40, furnace, plus freight, unloading, etc., charge of \$9.50, or \$54.90 f.o.b. cars Providence base. Other all-rail Southern spot iron, which is coming through in 15 days, has sold on a \$42 furnace base. Other sales reported include 1000 tons Virginia, silicon 2.25 to 2.75, third quarter, at \$45 furnace base, 500 tons eastern Pennsylvania, silicon 1.75 to 2.25, third quarter at \$47 furnace, 500 tons western Pennsylvania, silicon 1.75 to 2.25, June delivery, at \$44.50 furnace, and 200 tons, silicon 2.75 to 3.25, June delivery, at \$47.50 furnace, and 100 tons Lake charcoal, half prompt and half September delivery, at \$55 furnace. Otherwise sales have been few and far between. Buffalo furnaces are sold up for the rest of 1920, but some resale iron probably will be available a little later. These furnaces are getting about 40 per cent of equipment needed and most of this cannot come into New England. Delivered pig iron prices follow:

East, Penn., sil. 2.25 to 2.75.....	\$49.15 to \$51.15
East, Penn., sil. 1.75 to 2.25.....	47.90 to 48.90
Cent. & West. Penn., sil. 2.25 to 2.75.....	49.95 to 50.95
Cent. & West. Penn., sil. 1.75 to 2.25.....	48.70 to 49.70
Buffalo, sil. 2.25 to 2.75.....	49.15 to 50.15
Buffalo, sil. 1.75 to 2.25.....	47.90 to 48.90
Virginia, sil. 2.25 to 2.75.....	49.95 to 50.95
Virginia, sil. 1.75 to 2.25.....	48.70 to 49.70
*Alabama, sil. 2.25 to 2.75.....	49.45
*Alabama, sil. 1.75 to 2.25.....	47.75

*Alongside Boston prices.

Ferrosilicon.—One sale of 100 lb. and several of 500 lb. to foundries short of pig iron are reported at 6½c. f.o.b. shipping point.

Fluorspar.—All New England consumers have covered their nearby requirements, one recently having bought 300 tons at \$22.50 per ton f.o.b. shipping point.

Warehouse Business.—The warehouse price situation continues unsettled. A week or so ago, a majority of houses quoted iron and steel on a 5½c. base. Two of the largest, however, quoted 6c. base. To-day some irregularity still exists, but almost all concerns quote practically all sizes of iron and steel at 6c. base. Iron and steel continue to go out of stock faster than received. One warehouse has been trucking material from Perth Amboy. Some jobbing interests are trying to build the market on common carriage bolts and C. T. & D. nuts to list plus 25 per cent discount, set screws to 10 per cent discount and cap and lag screws to list, but are not meeting with co-operation. The Bethlehem Steel Co. is shipping some bolts and nuts into New England, but smaller producers depending on steel

mills for raw material are not getting it. Washers continue scarce, especially ½-in.

Jobbers quote: Soft steel bars, \$5.50 to \$6.50 per 100 lb. base; flats, \$6.50 to \$6.85; concrete bars, \$6 to \$6.50; tire steel, \$7 to \$7.50; spring steel, open hearth, \$11; crucible, \$16; steel bands, \$8 to \$8.25; steel hoops, \$9; toe calk steel, \$8; cold-rolled steel, \$10 to \$10.50; structural, \$6 to \$6.50; plates, \$6.50; No. 10 blue annealed sheets, \$9; No. 28 black sheets, \$9.15; No. 28 galvanized, \$10.50; refined iron, \$5.50 to \$8; best refined, \$7 to \$7.50; Wayne, \$8.50; band iron, \$8; hoop iron, \$9; Norway iron, \$20.

Old Material.—Aside from an inquiry for several thousand tons of No. 1 heavy melting steel for export to Liverpool and Scotland, most of which is bought, the market is quiet. Shipments on the export order extend over three or four months. As high as \$19.50 was paid for special steel, but the average price paid has been between \$18 and \$18.50, although some tonnage was taken at \$17.50. Machinery cast is easier, several sales at \$40.25 delivered in New Hampshire and at less money for nearer points being reported. Stove plate continues to decline, being fully \$1.50 cheaper than reported last week. Pennsylvania mills are taking small lots of cast iron borings at \$20.50 delivered; one local house is buying heavy axle turnings against old contracts; a Portland rolling mill is still interested in street car axles, and the Bethlehem Steel Co. is taking small lots of blast furnace borings and turnings at reduced prices, but the market otherwise is dull and easy. Mills are rejecting old material so freely, local shippers anticipate a further drop in market values. Old material, f.o.b. local yards prices, follow:

No. 1 heavy melting steel.....	\$18.00 to \$18.50
No. 1 railroad wrought.....	26.00 to 27.00
No. 1 yard wrought.....	28.00 to 24.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	18.00 to 19.00
Machinery shop turnings	14.00 to 15.00
Cast iron borings	15.50 to 16.00
Heavy axle turnings	15.50 to 16.00
Blast furnace borings and turnings	13.00 to 14.00
Forged scrap	13.00 to 13.50
Bundled skeleton	13.00 to 13.50
Street car axles	31.00 to 32.00
Car wheels	37.00 to 38.00
Machinery cast	38.00 to 39.00
No. 2 cast	34.00 to 35.00
Stove plate	24.00 to 25.00
Railroad malleable	26.00 to 27.00
Rerolling rails	27.00 to 28.00

Buffalo

BUFFALO, June 15.

Pig Iron.—The market is still being held back by adverse transportation conditions, but within the past few days some slight improvement has been shown, and shippers are encouraged. Some furnaces are experiencing grave difficulty with their coke supplies, which are coming in slowly, and the quality of the shipments is much below normal. It is so fine in some cases that iron exceptionally high in sulphur and silicon is of necessity being turned out. One furnace reports selling a carload here and a carload there, but no great amount of business or inquiry. Prices remain firm, though there has been, it is said, a slightly higher price paid for some shipments of emergency iron. In striking contrast to conditions reported generally, one furnace reports good business here during the week. This furnace sold about 5000 tons of iron, of which all but slightly less than 1000 tons was foundry iron. The smaller amount was malleable. The foundry iron sold at a base price of \$45, and the malleable at the regular price of \$46.25. This furnace interest reports a malleable inquiry of between 3000 and 4000 tons.

We quote f.o.b. Buffalo:	
No. 1 foundry, 2.75 to 3.25 sil.....	\$48.00
No. 2 X foundry, 2.25 to 2.75 sil.....	46.25
No. 2 plain, 1.75 to 2.25 sil.....	45.00
Basic	\$44.00 to 45.00
Malleable	46.25
Lake Superior charcoal	58.00 to 60.00

Finished Iron and Steel.—The traffic situation is somewhat improved, and the market is more active. One of the recent inquiries before this market was for 20,000 tons of bars, shapes and plates. This was put out by the railroads, and is understood to have been taken by the leading interest. The demand for plates is increasing and the inquiries are larger. There is an increased inquiry for structural material. Bars, cold finished material, wire products, tin plate, sheets are in strong demand. There is a heavy and increased

inquiry for sheets for oil well supplies, which have not been placed for even delayed delivery at a premium. There is inquiry for several thousand tons of oil well casing, including one for 1200 tons, another for 650 tons and another for 3000 tons. There has been increased plate placement, one mill here taking on business for delivery over the next three weeks. A sales agency here is offering 30 to 60-day delivery on plates. There is inquiry for several thousand tons of plates for export at prices considerably in advance of prices being asked in this country. Inquiry for concrete bars is better, though the tonnages asked for are small, and few are being taken. Shops are experiencing difficulty obtaining shipments of intermediate bars.

Jobbers quote the following prices for this territory: Steel bars, 4.6c.; iron bars, 5.26c.; structurals, 4.46c.; plates, 4.66c.; No. 10 blue annealed sheets, 6.51c.; No. 28 black sheets, 8.25c.; No. 28 galvanized sheets, 9.50c.; bands, 5.81c.; hoops, 6.06c.; cold rolled steel, 6.00c.

Old Material.—Some outside markets are opening up and in some, notably the Pittsburgh market, inquiry is a little freer for some materials. The fancied grades are heavy melting steel, turnings and hydraulic compressed. The latter is quoted about \$18.50 to \$19 here now. Malleable iron is scarce and the price maintained. Stove plate and cast scrap are not coming in freely and these prices are holding. Railroad lists which came in during the last week brought good figures, but very little came to this territory. New equipment planned by shops fabricating railroad material means increased supplies of low phosphorus. The railroads have resumed the interchange of old wheels. Car wheel makers are getting back from the railroads increased tonnages of old car wheels. This will have the effect of placing more car wheels on the market. These will, undoubtedly, be soon offered even more freely. We quote dealers' asking prices, f.o.b. Buffalo, as follows:

Heavy melting steel, regular grades	\$23.50 to \$24.50
Low phos., 0.04 and under	31.50 to 32.50
No. 1 railroad wrought	30.50 to 31.50
No. 1 machinery cast	37.50 to 38.50
Iron axles	39.00
Steel axles	39.00
Car wheels	37.00 to 38.00
Railroad malleable	30.50 to 31.50
Machine-shop turnings	15.00 to 16.00
Heavy axle turnings	19.50 to 20.50
Clean cast borings	16.50 to 17.50
Iron rail	29.50 to 30.50
Locomotive grate bars	23.50 to 24.50
Stove plate	31.50 to 32.50
Wrought pipe	20.50 to 21.50
No. 1 busheling	19.50 to 20.50
Bundled sheet stamping	16.50 to 17.50

St. Louis

ST. LOUIS, June 14.

Pig Iron.—Some little buying has been done in the pig iron market for immediate shipment and for special purposes, but no large contracts have been made, nor any sales for future delivery save that one of the largest interests on the east side of the river is reported to have placed orders for a considerable quantity of basic. This, however, lacks confirmation from the reputed parties in interest. The general conditions, the period of the year and the traffic situation are causing consumers to fight shy of all but essential commitments, although there is not at present any positive feeling in the local market that prices are likely to be sharply lower soon.

Coke.—Some movement of coke is reported from the Connellsville district, but not enough to cause any special hope that the situation is permanently relieved as regards fuel for this section. Operations continue to be interfered with from this and allied causes.

Finished Iron and Steel.—Practically no developments to change the situation in finished products have taken place. Deliveries on contract material are still much delayed and the warehouse conditions show no improvement.

For stock out of warehouse we quote as follows: Soft steel bars, 3.94c.; iron bars, 4.50c.; structural material, 4.04c.; tank plates, 4.24c.; No. 10 blue annealed sheets, 7.09c.; No. 28 black sheets, cold rolled, one pass, 8.10c.; No. 28 galvanized sheets, black sheet gage, 9.60c.

Old Material.—In the scrap market there has been little during the past week in the way of business save in the case of purchases by dealers from railroads on

lists put out and for which the dealers bid rather freely in order to get scrap to cover shortages in their sales. Included in the lists which were closed during the week were the Wabash, 1500 tons; Frisco, 1350 tons; Missouri, Kansas & Texas, 1200 tons; Pennsylvania, 2500 tons, and the Missouri Pacific, 600 tons. All these lists went at fair prices because of dealers' needs. We quote dealers' prices f.o.b. customers' works, St. Louis industrial district, as follows:

We quote dealers' prices f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton
Old iron rails.....\$31.50 to \$32.00
Old steel rails, rerolling.....30.00 to 30.50
Old steel rails, less than 3 ft.....24.00 to 24.50
Relaying rails, standard sections, subject to inspection.....50.00 to 55.00
Old car wheels.....34.50 to 35.00
No. 1 railroad heavy melting steel.....22.50 to 23.00
Heavy shoveling steel.....21.00 to 21.50
Ordinary shoveling steel.....20.50 to 21.00
Frogs, switches and guards, cut apart.....23.00 to 23.50
Ordinary bundled sheets.....13.00 to 13.50

Per Net Ton
Heavy axle and tire turnings.....14.00 to 14.50
Iron angle bars.....28.00 to 28.50
Steel angle bars.....21.00 to 21.50
Iron car axles.....39.50 to 40.00
Steel car axles.....32.50 to 33.00
Wrought arch bars and transoms.....31.00 to 31.50
No. 1 railroad wrought.....25.50 to 26.00
No. 2 railroad wrought.....23.50 to 24.00
Railroad springs.....21.50 to 22.00
Steel couplers and knuckles.....21.50 to 22.00
Locomotive tires, 42 in. and over, smooth inside.....20.00 to 20.50
No. 1 dealers' forge.....20.00 to 20.50
Cast iron borings.....13.00 to 13.50
No. 1 busheling.....19.00 to 19.50
No. 1 boiler, cut to sheets and rings.....17.00 to 17.50
No. 1 railroad cast.....35.00 to 35.50
Stove plate and light cast.....27.00 to 27.50
Railroad malleable.....24.00 to 24.50
Agricultural malleable.....23.00 to 23.50
Pipes and flues.....16.50 to 17.00
Heavy railroad sheet and tank.....16.50 to 17.00
Railroad grate bars.....26.00 to 26.50
Machine-shop turnings.....12.00 to 12.50
Country mixed.....17.50 to 18.00
Uncut railroad mixed.....18.00 to 18.50
Horseshoes.....24.50 to 25.00

Birmingham

BIRMINGHAM, ALA., June 15.

Pig Iron.—In another quiet week in the Alabama pig iron market the largest tonnage booked by any one concern was under 4000 tons. Of this a portion was for New England for shipment by rail and water in the immediate future and the rest for Southern delivery. Some additional export tonnage was taken on by a concern which now has total export bookings of around 10,000 tons. Some of the recent export iron is for Belgium. Makers refrain from booking all the iron for export that is offered in the apprehension that they might be caught short in delivery of domestic iron under contract. As a result of the quiet tone of the domestic market one hears of \$42 iron only. If any is sold above that figure, it is so inconsiderable in quantity as not to figure in the total. The car shortage, which set in June 1, has become really acute, and furnaces are piling iron in the exact reverse of the outward movement of March, April and May. When this accumulation process began total foundry yard stocks in Alabama were not over 70,000 tons. They will probably grow to 100,000 by the end of the month. Furnaces manage to secure raw material sufficient for operation and are working well. The month's production will be largest of the year. That of May was 54 per cent greater than that of May, 1919. The Southern iron melt gains monthly. The Southern steel production has also attained new high levels.

We quote per gross ton, f.o.b. Birmingham district furnaces, the Tennessee company excepted, as follows:

Foundry, sli. 1.75 to 2.25	\$42.00
Basic	41.00
Charcoal	55.00

Cast-Iron Pipe.—The Imperial Pipe Co. at Bessemer has begun putting in a new unit. Four new sanitary shops are about to come in. Water and gas pipe works report a satisfactory regular run of business. Houston is figuring on 10,000 ft. of water pipe. Gastonia, N. C., is about to order 1000 tons of water pipe. The price schedule remains at \$73 for 4-in. and \$70 for 6-in. and upward.

Old Material.—The scrap market is dull and featureless. Very little heavy steel is moving. Prices on this article are shaded in large transactions.

We quote per gross ton f.o.b. Birmingham district yards, prices to consumers, as follows:

Steel rails	\$21.00 to \$22.00
No. 1 steel	19.00 to 20.00
Cast iron borings	14.00 to 15.00
Machine-shop turnings	14.00 to 15.00
No. 1 cast	34.00 to 35.00
Car wheels	32.00 to 33.00
Tramcar wheels	31.00 to 32.00
Steel axles	29.00 to 30.00
No. 1 wrought	26.00 to 27.00

Cincinnati

CINCINNATI, June 15.

Pig Iron.—The market is extremely quiet, most of the sales reported during the week being for carload lots, though one sale of 300 tons of Southern foundry was reported at \$42 and 500 tons of Northern iron was taken by a central Ohio melter at \$45, furnace. We also note a sale of 1000 tons of Northern iron to a Canadian consumer at the same price. The sale of a round tonnage of Southern foundry for export was made during the week, at a price said to be \$1 above the domestic market. Inquiry is light, being mostly for spot iron, though an occasional inquiry is received for small tonnages for shipment during the third quarter. Much of the iron now being offered is off in analysis, and some of this is being taken by foundrymen to melt in place of scrap. No action has yet been taken on the 10,000-ton inquiry from Portsmouth, but it is expected to be closed this week. Talk of lower prices for iron continues to be heard in some quarters, but sellers say that they cannot see anything of the kind in sight, as furnaces are holding steadily to the prices now in effect, and with the increased cost of making iron, advances rather than recessions may be expected. A sale of 600 tons of ferromanganese is reported to an Ohio steel maker for last half delivery, with the price being withheld.

Based on freight rates of \$3.60 from Birmingham and \$1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	\$45.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	46.85
Ohio silvery, 8 per cent sil.	59.80
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	46.80
Basic Northern	41.80
Malleable	\$45.80 to 46.80

Coke.—The coke market is easier, and there is not the same insistant demand from foundries as has been in evidence during the past month or more. Better movement from the Connellsville field is given as the reason. Foundries have been able to accumulate a fair supply and are not over anxious to stock up at the present high prices, believing that lower prices on coke will be available shortly. Connellsville foundry and furnace coke are quoted at \$15 to \$16, and we note a sale of 6000 tons of foundry coke to a Chicago melter at \$15.25, ovens.

Finished Material.—Sheet mills in southern Ohio, which up to this time have been getting a fair supply of cars, are now experiencing difficulty in shipping their products from the mills. Box cars are scarce, and some consumers are asking that shipments be made in any cars available. The demand for sheets, while still active, is not so heavy as some time ago. Some sellers state that this falling off is due to the fact that buyers are getting discouraged by the deliveries promised, as most of the mills have enough business booked to carry them through the rest of the year. Production at mills is reported to have fallen off slightly since the warmer weather set in, as it is difficult to keep the workers steadily employed. Prices on sheets are firm, but the practice of asking premiums for deliveries by some independent mills is no longer in evidence. The demand for finished iron and steel is not so heavy as previously noted, but consumers are urging mills to speed up deliveries on contracts. With the exception of plates and shapes, which are quiet, warehouses report a brisk business, the only trouble being that transportation con-

ditions prevent the getting in of sufficient material to take care of the trade. No structural lettings are reported, though the Big Four Railroad is asking for bids for 250 tons for bridge replacements. This is expected to be awarded next week. For the foundry and annealing building at Louisville, Ky., of the Illinois Malleable Iron Co., bids are being received.

Jobbers quote: Iron and steel bars, 5c. to 6c.; structural shapes, 5.10c.; plates, 5c.; steel bands, 6.50c.; No. 10 blue annealed, 7.50c.; No. 28 black sheets, 9c. to 10c.; No. 28 galvanized sheets, 10c. to 11c.

Old Material.—The scrap market is dead as regards sales to consumers, though some inquiries are being received for steel scrap from steel plants in the Valley. No sales of any consequence are reported. Dealers, however, are optimistic as to the future, and are picking up some scrap. Buying prices on heavy melting steel have been marked down \$1 and borings and turnings 50c. during the week.

<i>Per Gross Ton</i>	
Bundled sheets	\$15.00 to \$16.00
Old iron rails	27.00 to 28.00
Relaying rails, 50 lb. and up	48.00 to 49.00
Rerolling steel rails	29.00 to 30.00
Heavy melting steel	21.50 to 22.50
Steel rails for melting	24.00 to 25.00
Car wheels	29.00 to 30.00

<i>Per Net Ton</i>	
No. 1 railroad wrought	\$25.00 to \$26.00
Cast borings	11.50 to 12.00
Steel turnings	9.50 to 10.00
Railroad cast	31.00 to 32.00
No. 1 machinery	35.00 to 36.00
Burnt scrap	22.00 to 23.00
Iron axles	29.50 to 30.00
Locomotive tires (smooth inside)	23.50 to 24.50
Pipes and flues	16.00 to 16.50
Malleable cast	22.00 to 22.50
Railroad tank and sheet	16.00 to 16.50

New York

NEW YORK, June 15.

Pig Iron.—The domestic market is very dull, and interest centers largely in foreign developments. Sales made by New York agencies include one of 5000 tons of southern foundry iron for shipment to Glasgow purchased on a base of \$42, Birmingham, or about \$56 delivered Glasgow. Although this figures out about £15 at the present rate of exchange, buyers do not hesitate much at this price, if they can obtain prompt shipment. Emphasis is placed on the importance of early shipments, as the iron is needed, and it is realized that present high prices may recede. The coke situation is highly unsatisfactory, especially as to New England and eastern foundries. Some sales have been made as high as \$17, Connellsville, for foundry coke, while even higher would have been paid if the coke had been obtainable. Added to troubles of the foundrymen as to coke are still many relating to transportation. The situation as to railroads has improved at Buffalo, but congestion continues in other sections, particularly along the New Haven in New England. The opinion of some shippers is that slow deliveries are caused by inadequate equipment fully as much as by a shortage of men due to the strike. The requirement of the Interstate Commerce Commission just put into effect, that all open top cars having sidings 36 inches or higher shall be used in hauling coal, has made it more difficult to obtain cars for shipment of pig iron.

We quote for delivery in New York as follows:	
East Pa., No. 1 fdy., sil. 2.75 to 3.25	\$50.05 to \$51.05
East Pa., No. 2 X fdy., sil. 2.25 to 2.75	49.05 to 50.05
East Pa., No. 2 fdy., sil. 1.75 to 2.25	47.80 to 48.80
Buffalo, sil. 1.75 to 2.25	47.90 to 48.90
No. 2 X Virginia, sil. 2.25 to 2.75	49.60

Ferroalloys.—There is an almost complete absence of demand for ferromanganese here for spot or last half delivery, and this situation is causing considerable surprise among sellers. If consumers expect lower prices, it is argued that this is unlikely under conditions prevailing in the manganese ore market and also because of the prospect that imports from Great Britain will not be any larger than they are for some time to come. Quotations are unchanged at \$225 to \$250, delivered, for June delivery and \$200, delivered, for the domestic alloy for the last half. The spiegeleisen market is very strong at \$75, furnace, at which level sales of a few small lots for domestic consumption are recorded.

The May output of ferromanganese, according to revised data of THE IRON AGE, was 22,663 tons and that of spiegeleisen, 10,744 tons. Manganese ore is scarce, and at least 80c. per unit is obtainable for early delivery. The 50-per cent ferrosilicon market is devoid of feature and quotations are more or less nominal at \$80 to \$90 per ton, delivered.

Warehouse Business.—Transportation continues to show a slight improvement, a fair number of shipments being received within three to four weeks. While in some cases there is a slight falling off in business, expected to continue through the summer, several warehouses state that there is an increase, particularly in export inquiries. The wire shortage is still acute. A warehouse that recently ordered a car-load of coppered Bessemer rods, straightened and cut to length, was allotted three tons. An order made by a warehouse for No. 9 annealed wire to use for binding material for shipment was turned down by the leading interest, which stated that it was 15 weeks behind on this material. Even small quantities of odd lengths could not be obtained. One of the large independent mills has offered to fill orders for spring steel in car-load lots to each size. The situation in the brass and copper mills is unchanged. We quote prices on page 1778.

High Speed Steel.—Domestic producers continue to quote \$1.25 to \$1.30 per lb., New York. The market is quieter, evidently a condition that will prevail during the summer.

Cast Iron Pipe.—The contract for supplying the city of Akron, Ohio, with 2500 tons of 48-in. pipe was awarded to the Camden Iron Works, Camden, N. J., the low bidder. Prices remain firm and orders are plentiful. We quote 6-in. and heavier at \$76.30, New York; 4-in., \$79.30 with \$2 additional for Class A and gas pipe.

Old Material.—Prices are still softer, with the exception of heavy melting steel, that of the industrial grade having been sold in the Pittsburgh district for \$26. For less select grades \$25.50 or \$25 are being received there. Among the grades which are decidedly weaker are borings and turnings, pipe and stove plate. Practically no eastern Pennsylvania mills are buying heavy melting steel, there being embargoes or orders from consumers to suspend shipments.

Buying prices per gross ton, New York, follow:

Heavy melting steel.....	\$19.50 to \$20.00
Rerolling rails	28.00 to 29.00
Relaying rails, nominal	52.00 to 54.00
Steel car axles.....	38.00 to 39.00
Iron car axles.....	42.00 to 43.00
No. 1 railroad wrought.....	30.00 to 31.00
Wrought iron track.....	22.00 to 22.50
Forge fire.....	14.00 to 14.50
No. 1 yard wrought, long.....	23.50 to 24.00
Light iron	9.00 to 10.00
Cast borings (clean)	16.00 to 16.50
Machine-shop turnings	15.00 to 15.50
Mixed borings and turnings.....	14.50 to 15.00
Iron and steel pipe (1 in. min. diam., not under 2 ft. long).....	19.00 to 19.50
Stove plate	24.00 to 24.50
Locomotive grate bars.....	26.00 to 27.00
Malleable cast (railroad).....	29.00 to 30.00
Old car wheels.....	35.00 to 37.00
Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:	
No. 1 machinery cast.....	\$38.00 to \$39.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	37.00 to 38.00
No. 1 heavy cast, not cupola size.....	30.00 to 31.00
No. 2 cast (radiators, cast boilers, etc.)	31.00 to 32.00

Finished Iron and Steel.—The domestic market is relatively dull, but buying on foreign account has been good. One steel company has booked a greater tonnage for export in June than for the same period in May, and the month promises to more than double May from the standpoint of volume. Good prices still obtain in export, round lots of various forms of finished steel going at 4c., Pittsburgh, except plates on which 3.75c. has been done. Some mills appear to be desirous of moving semi-finished steel and sizable lots have been offered. Skelp has been sold at 4c. per lb. and billets at \$70, Pittsburgh. Carload lots of tin plate have brought \$12 per base box. The domestic situation is that mills are not concerned over the slump in purchasing, while buyers are willing to await betterment in transportation before committing themselves with the

present indefiniteness of delivery and the expectation that prices will be no higher. Prompt delivery sales of plates and shapes are still made at 4c. Several hundred tons of sheared plates, however, were sold at 3.60c., Pittsburgh basis, and universal plates at 3.50c. The largest structural proposition is the court-house for New York involving 9000 tons. Among recent awards are a bridge at Brattleboro, Vt., 300 tons; a schoolhouse in Bronx Borough, New York, 500 tons; Oberdorfer Brass Co., Syracuse N. Y., 650 tons, all to the American Bridge Co. The Boston elevated railroad will require 750 tons for extension.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.52c.; shapes, 2.72c. to 4.27c.; plates, 2.92c. to 4.27c., the minimum prices being for indefinite delivery and the highest prices for delivery in a few weeks; bar iron, flats, wider than 6 in., 4.57c.; 3/8 and 7/16 in., round and square, 5.27c.; light rounds, squares and flats, 5.77c., and other sizes, 4.27c.

Cleveland

CLEVELAND, June 15.

Iron Ore.—The shortage of cars for handling ore was more acute Monday than at any time since the start of the switchmen's strike. This is attributed by ore men to the diverting of open cars to the movement of coal. They believe that many of these cars are being loaded with coal for shipment to other than Lake points, where they would be available for the loading of ore. Boats are frequently held for three days waiting to unload cargoes, and some are being delayed for a longer period. Shipments of ore from Lake Erie ports to June 1 were 4,247,606 gross tons as compared with 4,726,600 tons during the same period last year. May shipments from these docks were 2,861,758 as compared with 3,279,263 tons during May, 1919. The falling off in dock shipments up to June 1 was less than had been expected, in view of the handicaps due to the transportation situation. The balance on docks June 1 was 6,312,575 tons as compared with 5,944,994 tons on the same date a year ago. Receipts at Lake front furnaces at Lake Erie ports to June 1 were 961,097 tons as compared with 1,374,515 to June last year.

We quote, delivered lower Lake ports: Old range Bessemer, \$7.45; old range non-Bessemer, \$6.70; Mesaba Bessemer, \$7.20; Mesaba non-Bessemer, \$6.55.

Pig Iron.—The pig iron market is very dull. There is still some demand for foundry iron for early shipment, and one interest reports sales during the week aggregating 1400 tons, most of which was for early shipment. While some foundries are crowding the furnaces for deliveries, others that have curtailed production because of the scarcity of coke and other causes will carry considerable second quarter iron over into the last half. When the railroad situation was having its most serious effect, Cleveland foundries got down in their output to 60 per cent of capacity, but are doing much better now. The railroad situation improved in respect to pig iron shipments during the week and producers generally in this territory were able to ship all their output. One also succeeded in securing cars to ship some iron from its stock pile. Prices show no fluctuation, all sales being made on the basis of \$44 for No. 2 foundry for prompt shipment and \$45 for last half. The steel-making pig iron market is inactive. The only inquiries are one from an Illinois car wheel manufacturer for 500 to 1000 tons of high manganese malleable iron for early shipment and another from a Dayton, Ohio, consumer for 400 tons of low phosphorus iron. There is also an inquiry from Dayton for 200 tons of ferrosilicon. Southern foundry iron is lifeless.

We quote delivered Cleveland, as follows, based on 40c. switching charge for local iron, a \$1.40 freight rate from Valley point, and \$5 from Birmingham:

Basic	\$43.40
North. No. 2 foundry, sil. 1.75 to 2.25	\$44.40 to 45.40
Southern foundry, sil. 2.25 to 2.75	48.70
Gray forge	41.40
Ohio silvery, sil. 8 per cent	61.40
Standard low phos., Valley furnace	51.00 to 52.00

Coke.—Coke shipments continue very poor, but foundries are not suffering from the scarcity of fuel.

However, it is claimed that much of the coke recently shipped to Cleveland is of inferior quality. Sales of Connellsville furnace coke are reported at as high as \$16.50 outside of this territory. Foundry coke is quoted at \$15 to \$16 for early shipment, but very little is being offered.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are doing considerable business in third quarter contracts from implement manufacturers, other consumers and jobbers. Some business is also coming from the railroads. Most manufacturers are declining to take contracts beyond the third quarter. The market is very firm in this territory at the recent advance in prices, although Pittsburgh makers are reported to be selling at the old prices. Manufacturers state that the price question does not appear to be of as much interest to consumers as the matter of securing deliveries. Rivet makers are getting good specifications on contracts.

Finished Iron and Steel.—The most important feature of the market is a further softening in plate prices. Local mills that have been on a 4c. basis are taking orders at 3.75c., and 3.50c. is becoming more general with outside mills. Structural material is also easier. One mill that has been on a 4c. basis has withdrawn this price, and while there is not sufficient inquiry to test the market, the price for early shipment is around 3.10c. to 3.25c. Steel bars continue firm and are still being quoted up to 4c., although a Pittsburgh district mill is taking orders at 3c. for rather early delivery. A western Pennsylvania mill is still quoting hard steel reinforcing bars at 4c., being able to take business at this price in competition with a prevailing 3.75c. price because of better deliveries. The only inquiry of any size that has come up for some time is for 300 tons for a building in Akron. Local fabricating shops are getting a fair volume of small work, but no structural jobs of any size are being figured on in this territory. Bids have been taken for an office building for the State of Pennsylvania at Harrisburg requiring 2200 tons. Railroad shipments have further improved and local mills are now able to ship their entire output. However, shipments from the Pittsburgh district are still slow and some material is being brought from that district by truck. Some consumers have used up their surplus stocks and are more urgently in need of material than at any time during the railroad strike. Cold-rolled steel is in good demand and sales are being made at 4.25c. A Chicago warehouse that is shipping steel into this territory has advanced prices on No. 12 and heavier gage bands from 5.07c. to 5.82c. The easing up in mill prices so far has no effect on local warehouse prices.

Cleveland warehouses quote steel bars at 3.27c. to 5c.; plates, 3.57c. to 5c., and structural material, 3.70c. to 5.10c.

Sheets.—Sheet prices show a further softening. Local mills that have been selling blue annealed sheets up to 6.25c. are now quoting this grade at 5.50c. to 6c., and one producer which has been selling black sheets at 8c. is taking orders at 7.50c. There is still a good demand for automobile body sheets, which are firm at from 7.85c. to 8c. for No. 22. Jobbers quote out of stock No. 28 black 8.50c. to 9c., No. 10 blue annealed, 8.10c. and No. 28 galvanized, 9.50c. to 10c.

Old Material.—The scrap market became somewhat more active during the week, as consumers are showing more of a disposition to buy at the ruling market prices. The market is inclined to weakness, particularly on borings and turnings. Cleveland mills are not buying, the activity being confined mostly to Valley consumers and dealers, and most of the steel making scrap produced here is now being shipped out of the city to Valley points. We note the sale of 1000 tons of heavy melting steel scrap to a Canton mill at \$24.50, and dealers are paying \$25 for this grade for shipment to Valley points, but only \$23.50 for shipment to Lorain. Dealers are still having much difficulty in getting shipments through to Valley mills. Outside of steel-making scrap, prices are firm. Dealers are

offering \$31 for railroad malleable and around \$32 for grate bars.

Dealers quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel.....	\$23.25 to \$23.50
Steel rails, under 3 ft.....	25.00 to 27.75
Steel rails, rerolling.....	31.00 to 32.00
Iron rails	32.00 to 33.00
Iron car axles	41.00 to 42.00
Steel car axles	36.00 to 37.00
Low phos. melting scrap.....	26.25 to 26.50
Cast borings	15.75 to 16.00
Machine shop turnings	11.25 to 11.50
Mixed borings and short turnings	15.25 to 15.50
Short turnings for blast furnaces	15.25 to 15.50
Compressed steel	18.00 to 18.50
Railroad wrought	28.00 to 29.00
Railroad malleable	30.00 to 31.00
Steel axle turnings	19.50 to 20.00
Light bundle sheet scrap	14.00 to 14.25
Drop forge flashings over 10 in.....	14.50 to 15.00
Drop forge flashings under 10 in.....	16.50 to 17.00
No. 1 cast.....	41.00 to 42.00
No. 1 busheling.....	18.50 to 18.75
Railroad grate bars.....	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron wheels	37.00 to 38.00

San Francisco

SAN FRANCISCO, June 10.

Freight conditions are reported to be showing steady improvement, and with the falling demand for many lines of material some stocks are showing better condition.

Bars, Plates and Shapes.—The mills are reported to be catching up with their back orders, as new orders are slated to be falling off somewhat locally. The continued unfavorable financial conditions in Japan have practically eliminated that market for the time being. However, some shipments direct to China and other points in the Orient are reported. The shops are using very few plates at the present time and brokers state that it is not uncommon to divide a carload of plates among four or five shops, any one of which would have taken the entire car a few months ago. Sheets are in better demand, especially galvanized, of which jobbers still report a considerable shortage.

Cast-Iron Pipe.—The curtailment of credits in banks is having a detrimental effect on the sale of municipal bonds and this in turn is holding up the sale of large quantities of cast-iron pipe. Inquiry is active, but actual sales are dull.

Wrought Pipe.—Only a small percentage of wrought pipe needed in this State for the development of the oil and other interests is being received. The development of fuel oil in California is almost at a standstill on account of this lack of pipe, and coming at a time when there is a shortage of fuel oil for really essential industries, the holding up of the development of the oil resources is a serious matter.

Pig Iron.—There is not much movement in pig iron. While there have been no changes in prices, the users are looking for lower prices and the market is regarded as soft.

Coke.—Some coke is constantly arriving from the East and South, but not enough to maintain stocks in this city. Shipments of coke from the North have been made, and while this coke is not regarded as good as the Eastern and Southern product, it has found ready sale.

Old Material.—Prices are being maintained, although there appears to be a tendency towards lower quotations. With lessened demand, lower prices may be expected. Heavy melting steel brings about \$27 and cast iron about \$47.50. Some cast iron scrap is reported to have been sold as low as \$46, and one lot where there were delivery charges brought \$50.

Proper lubrication as a means of prolonging the life of wire ropes was discussed in an article in the May issue of *Lubrication*, published by the Texas Co., 17 Battery Place, New York. The article also illustrates and describes typical cross sections of wire ropes, common abuses to which wire ropes are subjected, and the bad effects of corrosion.

The Vanadium Alloys Steel Co., Pittsburgh, has issued a booklet descriptive of Vasco vanadium tool steel. It contains much information of value and suggestions concerning heat treatment, etc.

IRON AND INDUSTRIAL STOCKS

Three Factors Cause Prices to Move With Uncertainty

Politics, credits and the steel business are the three factors which have caused prices for iron and industrial stocks to move with uncertainty of late. The fundamental soundness of the present and future tremendous steel business has made for investing confidence, but with the one convention out of the way and the other about to be held, misgivings as to party politics have been reflected in prices for stocks. The credit situation is easier than it has been, but is still far from stable, and prices of securities as quoted from day to day depend largely on going money loaning rates.

Fears of a wholesale reduction in prices for materials are less pronounced, manufacturing interests believing increased exports, which will materialize as rates of exchange equalize, will to a large extent offset any decrease in domestic consumption. The recent decline in the value of silver should help to place gold on its proper international standard. It therefore appears that the industrial situation in this country is not likely to be seriously disrupted in the period of readjustment. This fact, taken in conjunction with the above mentioned factors, probably accounts for the slight advantage gained in security values notwithstanding the uncertainty of the market from day to day.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	36 1/4 - 38	Lake Sup. Corp.	13 1/4 - 14
Allis-Chalm. pf.	- 77	Midvale Steel.	42 1/4 - 43 1/2
Am. Can. com.	38 1/4 - 41 1/2	Nat.-Acme	34 1/2 - 34 1/2
Am. Can. pf.	91 1/4 - 91 1/2	Nat. E. & S. com.	66 1/2 - 67 1/2
Am. Car Fy. com.	137 - 143 1/2	N. Y. Air Brake.	96 1/2 - 99
Am. Loco. com.	95 1/2 - 100 1/2	Nova Scotia Steel.	51 - 54
Am. Loco. pf.	97 1/2 - 98 1/2	Press. Steel com.	98 - 101
Am. Steel F. com.	39 - 40	Press. Steel pf.	- 98
Am. Steel F. pf.	- 87 1/2	Ry. Stl. Spg. com.	97 - 100
Bald. Loco. com.	115 1/4 - 119 1/4	Replodge Steel.	84 - 89 1/2
Beth. Steel com.	90 1/2 - 91	Republic com.	89% - 94
Beth. Stl. Cl. B.	89 1/2 - 93 1/2	Republic pf.	94 - 94 1/2
Beth. Stl.	8% - 107 1/2 - 110 1/2	Sloss com.	64% - 67 1/2
Case, J. I. pf.	93 - 94 1/2	Sloss pf.	- 88
Chic. Pneu. Tool.	86 1/2 - 90	Superior Steel.	49 1/2 - 50 1/2
Colorado Fuel.	32 1/2 - 34	Transue-Williams.	54 1/4 - 56 1/2
Cruc. Steel. com.	136 1/2 - 154	Un. Alloy Steel.	42 1/2 - 44
General Electric.	140 - 145 1/2	U. S. Steel com.	92% - 95
Gt. No. Ore Cert.	35 1/4 - 36	U. S. Steel pf.	104 1/2 - 105 1/2
Gulf States Steel.	60 - 62 1/2	Vanadium Steel.	74 1/4 - 83 1/2
Int. Har. com.	129 1/4 - 135 1/4	Va. I. C. & Coke.	109 - 110
Lackaw. Steel.	63 1/2 - 73 1/2	Westingh. Elec.	49 - 50

The directors of the Brier Hill Steel Co. have called a special stockholders' meeting for July 2, to approve a plan of refinancing to issue shares of common stock for each share now authorized. A 20 per cent common stock dividend declaration was rescinded. The company has 150,000 shares of common.

The Hoosier Rolling Mill Co., Terre Haute, Ind., has had plans drawn for a spring plant, which will be one of the units of the works to be constructed at Steelton, a suburb of Terre Haute.

The directors of the Metal Specialty Mfg. Co., Waterbury, Conn., have authorized an increase in the capital stock from \$100,000 to \$200,000, or from 1000 to 2000 shares.

The Draper Corporation, Hopedale, Mass., textile machinery, lately received a car of sheets, the first to be delivered from the mill with which the order was placed since early in February.

The W. H. Hester Co., with sales offices in Atlanta and Valdosta, Ga., and warehouses in Atlanta and Savannah, has been organized and will deal in nails, galvanized roofing and sheets, tin plate, wire fencing, etc.

Wage Conference Fails to Agree

YOUNGSTOWN, OHIO, June 15.—The annual wage conference at Atlantic City between representatives of sheet and tin plate manufacturers and the Amalgamated Association of Iron, Steel and Tin Workers to fix a scale for 1920-21 adjourned without agreement. Independent manufacturers say the men asked advances on the base amounting to more than 25 per cent in some instances, which the mills could not meet. Another conference is to be arranged. The possibility of a temporary suspension of some sheet mill plants until an agreement is reached is seen, as the Amalgamated Association's representatives declared the men are anxious for a vacation.

British Imports of German Motor Vehicles

LONDON, ENGLAND, May 28.—According to the American Chamber of Commerce in London, the Board of Trade returns reveal that during the month of April no less than 718 commercial motor vehicles were imported from Germany into Great Britain, while in the same period only 200 were imported from America. The low value of the mark is said to be responsible for the large imports, and reliable German cars have been obtainable in Great Britain at a tempting figure for some time past.

But this desirable state of affairs is not likely to continue, says the American Chamber, since German manufacturers have now decided that from the middle of May they will charge for all exports in the currency of the country to which they are sent. This step, logical though it may seem to German manufacturers, is likely to remove the general incentive, namely, cheapness, for imported German cars, and as a result the probabilities are all in favor of increased imports of American cars.

Tin Mill Machinery for India

Some American machinery has been bought for the tin plate mills of the Tin Plate Co. of India, which is to make oil cans for the Burmah Oil Co., as already mentioned in these columns. The hot and cold mills will be built by Mackintosh, Hemphill & Co., the gear reducers and drives by the Woodward Machine Co. and the motors by the General Electric Co. The initial installation involves three groups of four stands each of 28-in. hot mills and three parallel lines of hot mills, each of four stands. The Thomas & Davies tinning machine, which has been used in the Melingriffith Works, Cardiff, will be used; at least one-half dozen of these machines have been bought.

Records Broken at Edgar Thomson

PITTSBURGH, June 15.—Some records for production of pig iron and steel were made last week at the Edgar Thomson blast furnaces and steel works of the Carnegie Steel Co. at Bessemer, Pa. On Thursday, June 10, Edgar Thomson blast furnace "C," for the week ending June 11, made 3535 gross tons of iron. On Wednesday, June 9, the new No. 2 finishing mill of Edgar Thomson rolled 1803 tons of standard section rails, and for the week ending June 11 this mill rolled a total of 8213 tons of rails. This No. 2 mill is equipped to roll either billets, sheet bars or rails, and the above is the largest tonnage of rails it has rolled in any one week since it was built.

Chaleur et Industrie is the name of a new publication which has appeared in France. It is to be devoted to the theory, application and economics of heat, covering solid, liquid and gaseous fuels, gas producers, furnaces, dryers, exchangers, superheaters, exhausters, compressors, etc. Thermodynamics, thermometry, calorimetry, etc., are to be covered and the program includes studies of standardization, tests, general reports, statistics and general descriptive matter. The first number, March, 1920, indicates that the publication offices are located at 10 rue des Marronniers, Lyon, France.

BRITISH AWAIT DECLINE

Export Firm Advises Customers to Buy Sparingly—South America and East Indies Offsetting Japanese Losses

Exporters to Japan and other Far Eastern markets now look forward to a resumption of light buying by next fall, when the shortage of material caused by cancellations and reselling out of the country will begin to be felt. Prices of practically all kinds of material have dropped about one-third under the prices prevailing before the depression. For example, No. 8 gage galvanized wire, which was quoted in Japan at Y15.60 per 100 lb., is now selling in the neighborhood of Y10. While China has undoubtedly absorbed a large portion of the material resold by the Japanese, according to some reports the ill feeling between Chinese and Japanese merchants, engendered by political relations has prevented these sales being greater. The chief activity in the Orient continues to be in the Dutch East Indies. One large export concern reports that cancellations and requests to sell from Japanese buyers during May were almost offset by increased business from the Dutch East Indies and South America.

South American buying shows a slight increase for all kinds of material. An exporter dealing exclusively in rails and supplies booked orders during May for 4000 tons of 16 to 25-lb. rails to South American markets alone. One large export concern dealing with all foreign markets, however, is advising its customers to purchase only for immediate needs as a precaution against a possible drop in prices.

In Europe purchasing of plates and structural steel is fairly heavy with some orders for billets from England, which is also the principal buyer of plates. Exporters dealing with England note a falling off in sales of plates evidently caused by offerings of Belgian material at a lower price, while at the same time it is becoming more difficult to obtain orders for sheet bars, even at \$10 per ton less than the price recently prevailing. English buyers believe that there is a falling market in the United States and that prices will be lower, particularly in plates.

Despite the reluctance of many to buy, an inquiry is in the market from England for 5000 tons of billets and numerous small inquiries are received for wire and wire rods. One concern in New York recently shipped 300 tons of billets to England at a good price. An exporter in New York has received a cabled offer from a Belgian rolling mill of 100 tons of plates, rolled to the metric scale, at 10c. per lb., c.i.f., New York. Italy continues to buy small quantities of pig iron, sheets, pipe, plates and billets and sales to Sweden and Holland are chiefly for pig iron.

Prospect of an early break-up of the dock strike at the port of New York is a source of optimism to most exporters, who have shipments on the rails that they have been unable to move. A large export company states that since the railroad embargoes and dock strike it has had about \$1,000,000 tied up in unshipped material.

British Iron and Steel Market

Japanese and Belgian Pig Iron Offered—Demands of Tin Plate Workers—Truce in Sheffield (By Cable)

LONDON, ENGLAND, June 15.

Cleveland producers have placed a ban on all exports of pig iron. Supplies of foundry iron are still insufficient for domestic needs. Prices are unaltered. Scotch makers refuse to sell for export pending a meeting to be held soon. One thousand tons of Belgian pig iron has arrived here and Japanese pig iron, similar to Gartsherrie, has been offered at £17 to £18, c.i.f. Makers of hematite iron are not quoting far ahead,

although a fair business is being offered, Italy being in the market. Prices are unchanged. The car situation is somewhat better. The market for foreign ore is dull.

Conditions in the steel market show little improvement, and makers are generally not quoting for export, but Scotch makers of angles are quoting firm prices for export and dropping the clause referring to an advance in values. A six weeks' truce has been arranged in the Sheffield strike, pending negotiations.

The Sambre-Moselle plants are now rolling angles, flats and tees.

American merchant bars have sold at £26, c.i.f., United Kingdom. The Continent is buying up Japanese resale offerings.

The tin plate market is quiet and buyers are expecting lower prices owing to the decline in tin. Makers, however, are resisting the new claims of tin plate workers which include a 50 per cent advance in wages as from July 5, a 6-hr. working shift, the increase in wages to be taken on the basis of the 8-hr. shift, the double manning of mills, stopping the mills when necessary, and the elimination of speculators and dealers.

We quote per gross ton except when otherwise stated, f.o.b. maker's works, with American equivalent figured at \$3.94 for £1, as follows:

Ship plates	26	0 to 34	0	\$102.44 to \$133.96
Boiler plates.....	28	10 to 37	0	112.29 to 145.78
Tees	20	10 to 33	0	80.77 to 130.00
Channels	25	15 to 33	5	101.45 to 131.00
Beams	25	10 to 32	0	100.47 to 126.08
Round bars, $\frac{3}{4}$ to 3 in....	28	0 to 33	10	110.32 to 131.99
Rails, 60 lb. and up.....	23	0 to 25	0	90.62 to 98.50
Billets	26	10 to 27	10	104.41 to 108.35
Sheet and tin plate bars,				
Welsh	25	0 to 32	0	98.50 to 126.08
Galvanized sheets, 24 g.....	55	0 to 60	0	216.70 to 236.40
Black sheet, 24 g. to 26 g. 50	50	0 to 54	0	197.00 to 212.76
Tin plate, base box*	3	12 to 3	12 $\frac{1}{2}$	14.18 to 14.28
Steel hoops	38	15 to 39	0	152.67 to 153.66
Cleveland basic iron.....	11	7 $\frac{1}{2}$		44.79
West Coast hematite.....	14	15		58.11
Cleveland No. 3 foundry (export to allies).....	10	5		40.38
Ferromanganese	35	0 to 40	0	137.90 to 157.60
Coke	3	2 $\frac{3}{4}$		12.46

*Prompt delivery; for Aug.-Sept., 68s. (\$13.39.)

"Hack Saws and Their Use" is the subject of a 63-page booklet distributed by the L. S. Starrett Co., Athol, Mass. The purpose of the book is to promote the intelligent and efficient use of all makes of hack saws rather than to solely advertise Starrett hack saws. One of the most important factors in efficient cutting with a power hack saw machine is the maintenance of the proper pressure on the blade during the whole of a series of cuts. The maximum of efficiency, the book explains, is to be found in the saw that combines cutting efficiency with endurance. While a hack saw must be made to stand a great amount of abuse, there are nevertheless limits beyond which it will not go. Where a saw is forced to cut under a greatly excessive weight, the user must decide for himself whether or not the gain in time per cut offsets the loss in saws, spoiled stock, etc. In order to make it possible for the user to select the saw best suited for the work in hand, a hack saw chart based upon the different materials which have to be cut in ordinary work is shown. This enables the machinist to select the proper blade by looking, not for the number of a blade, but for the name of the material he has to cut and employing the blade indicated under that heading on the chart. Other charts are included to show the effect of weight on the time of cut, effect of pressure on time per cut and efficiency of saw, effect of insufficient pressure, effect of proper regulation of weight on cutting speed and life of saw, the effect of using lubricant on time per cut and on life of saw, etc.

The pig iron production in German Austria (Styria and Salzburg) is reported to have now reached 20 per cent of the normal rate before the war of about 600,000 tons per annum. The steel output now averages from 30 to 40 per cent of the normal quantity.

TAKING OVER GERMAN WORKS

Activities of Various French Steel Companies— Fuel Problem Dominating (Special Correspondence)

PARIS, FRANCE, June 1.—The French Government has leased three coal concessions which were controlled before the war by the German mining administration, in the prolongation of the basin of Sarrebruck in the direction of Remilly-Nomeny. These three concessions, each of 5000 acres, have not yet been explored, as the German law permits their concession as soon as a sounding has attained the first layer. The lease is for 99 years for the sum of 2000 francs the hectare (2.47 acres). The purchasing groups are those which have bought from the sequesters most of the iron and steel plants in Lorraine. They comprise notably Marine-Homécourt, Acieries de Longwy, Mokta el Hadid, Micheville, Denain-Anzin, Acieries de France, Pont-a-Mousson, Pedange and Hauts Fourneaux de la Chiers. Only after considerable work can the value of these concessions be learned. In view of what is known in the region of Nomeny-Eply, coal should be found at a considerable depth, near the maximum practical for economical exploitation.

Owing to a shortage of coke the blast furnaces at Belval (division Adolphe Emile) of the Société Métallurgique des Terres Rouges have not started up as had been expected. Thus there are in operation only two blast furnaces out of the total of 11 belonging to the Esch plant of the Société Métallurgique des Terres Rouges (Rothe Erde). The steel and rolling mill divisions have been operating for two weeks. This company received at Esch, on May 24, via Antwerp, its first train of English coal.

The Usines Buderus at Wetzlar and the Usines Roechling at Voelklingen (Sarre) have formed a new company with a capital of 30,000,000 marks for the purpose of erecting at Wetzlar a large electrical steel plant.

The Acieries Réunies de Burbach-Eich-Dudelange are to participate to a considerable extent in the Felten & William Co., a German concern at Cologne-Mülheim. The latter will double its capital and half of the new portion, 60,000,000 marks, will be subscribed by the Luxembourg group represented by Burbach and la Métallurgique des Terres Rouges. An agreement will be concluded between the two companies for the exchange of raw material. Previous agreements had been concluded by the German company with the Allgemeine Elektricitäts Gesellschaft and a German-American group represented by Warburg of Hamburg, so as to avoid majority control falling into the hands of foreigners.

At the Differdange division of the Acieries de Differdange-St. Ingbert-Rumelange, two blast furnaces were restarted recently. The company's plant at Differdange is entirely new. It has 16 blast furnaces of a daily capacity of 1350 tons of pig, five converters of 20 tons each, rolling mills for rails, beams, merchant iron, etc. It was the first on the Continent to use the Grey patent rolling process for beams. The company's ore supply is assured by 2325 acres of concessions situated in the Grand Duchy of Luxembourg and 3554 acres in Meurthe and Moselle. The Usine de Rumelange comprises three blast furnaces and that of Ottange (Lorraine) also three units. That of St. Ingbert, northeast of Sarrebruck, has a steel plant with three 15-ton converters.

The Mines et Usines de Redange-Dilling has just been formed with a capital of 26,683,000 francs. This concern had been adjudged for the sum of 18,400,000 francs to M. Th. Laurent, acting in behalf of the Sociétés Micheville, Acieries de France, Forges d'Alais and Marine-Homécourt. It has three blast furnaces, with capacity of 120,000 tons.

The administrative council of the Usines Mannesmann has approved an agreement with a French industrial group, at the head of which is Montbard-Aulnoye, in view of the formation of an independent company, comprising the Usines de Sarrebruck and Bous. In this

new company the French will participate to the extent of 60 per cent estimated at 39,000,000 francs, which will be paid to the Usines Mannesmann at Düsseldorf. The stocks which have been turned over will be the object of a special sale. The new company which is being formed will have a capital of 50,000,000 francs. The group is composed largely of tube manufacturers. Imports to France of tubes from works in the Sarre have been greatly limited during four months. Obliged to supply themselves from countries where exchange has been unfavorable, the French were compelled to sign onerous contracts. Control of the Mannesmann works will permit easier purchases. It is noted, furthermore, that the shipments from these plants have become more regular.

French Steel Prices

Recent quotations of the Comptoir Siderurgique de France have been as follows: Semi-finished steel, 945 francs per metric ton; beams, 1195 francs; rails, 1225 francs. The comptoir for sheets and large flats has quoted the following: Large flats, 137 francs; large sheets, 138 francs; medium sheets, 163 francs; fine sheets, 169 francs.

Plants in the region of Meurthe and Moselle (Lorraine) received shipments of coke from Westphalia recently under conditions fairly normal, although the quantity was far from sufficient for the needs. It is certain that hereafter the export of French ore to Germany will not continue as long as the Germans will not deliver the amount of coal agreed upon. The French Minister of Public Works has announced that all exports of French ore to Germany are concluded. Thus to procure the ore the German iron and steel industry must make new agreements.

In view of the shortage of coke resulting from the suspension of shipments from England there is talk of importing coal from America suitable for coking and coking it in Belgium, which could profit in the utilization of its by-products. It is believed that this coking coal could be brought to Europe at \$30 a ton, which would be more favorable than the price of English coke.

The coal shortage has affected the Grand Duchy of Luxembourg as well as France and Belgium. A Luxembourg newspaper, published in German, reported some time ago that out of 49 blast furnaces only four were operating. During the strikes in iron and steel works of Lorraine the exportation of fuel to the Grand Duchy was prohibited. In certain plants, notably at Differdange, workers are reported to be agitating, claiming that the distribution of coal was not equitably carried out.

Decreased Dominion Earnings

The annual financial statement of the Dominion Steel Corporation, Sidney, N. S., for the year ended March 31, last, shows a lowering of profits, the year being one of the leanest experienced by the corporation for some time. Income for the year, including interest on investments and surplus funds, after deducting all manufacturing, selling and administration expenses, but before charging provision for sinking funds, depreciation and interest, amounted to \$5,532,529, being down from \$8,768,054 in the previous year. After deducting depreciation, sinking fund renewals, etc., totaling \$1,266,856, against \$1,304,323 and interest on bonds and debentures, \$1,004,060, against \$1,013,263, net income available for dividends was \$3,261,613, against \$6,450,468 in 1919. After the usual preferred dividends, net profits available on the common stock amounted to \$2,281,613, against \$5,470,468 in the previous year.

Grand President Edward H. Fitzgerald, of the Brotherhood of Railroad Clerks, who is in the South in connection with the strike of clerks on numerous Southern railroads, declared in Cincinnati that he had been favorably impressed with the Railroad Labor Board, and that he believed it will turn out better than the railroad brotherhood officers expected at the time of the passage of the Esch-Cummins Act. Mr. Fitzgerald confidently expected that the board would award a partial wage increase of about 18 per cent to all classes.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

June	Lake	Electro-	Copper		Tin		Lead		Zinc	
			New	York	New	York	St.	New	St.	Louis
9	19.00	19.00	48.50	8.75	8.50	8.05	7.70			
10	19.00	19.00	46.50	8.75	8.50	8.00	7.65			
11	19.00	19.00	48.25	8.75	8.50	7.95	7.60			
12	19.00	19.00	46.50	8.75	8.50	7.95	7.60			
14	19.00	19.00	46.50	8.75	8.50	7.95	7.60			
15	19.00	19.00	45.50	8.75	8.50	7.90	7.55			

NEW YORK, June 15.

Demand for all the metals is exceedingly light, and the markets are very quiet. Copper prices are unchanged, but buying is of small proportions. The tin market has again declined, and consumers show little interest. The lead market is a little easier, but there is no activity. Demand for zinc is of the hand-to-mouth order, but prices are fairly steady. Antimony has declined in sympathy with silver.

New York

Copper.—Leading producers of both Lake and electrolytic copper continue to maintain their prices firm at 19c., New York, for June-July delivery and see no reason to lower them, despite the fact that buying is exceedingly light. Not only has consumption declined because of the recent railroad and labor troubles, but production has also been curtailed. Had conditions remained normal, as of the early part of April, a buying movement would have been due about this time, but it is now generally conceded that this has been postponed a couple of months or more because consumers who bought freely in March covered their needs into June and in some cases through July and have a portion of this unconsumed. There continues to be a fair amount of buying for export. Here and there small amounts of the metal can be obtained from outside sources at anywhere from 18.25c. to 18.75c., and there have been sales from first hands at 19c. in the last week.

Tin.—This market continues quiet and dull. The buying that has been recorded has been mostly by dealers, London interests doing most of the selling. Consumers have shown some interest recently, but appear to be afraid to make purchases, being still in an unhealthy frame of mind because of transportation and labor troubles. Most of them are also fairly well supplied for several months longer. Yesterday the market was quiet and about nominal as to prices. On that day London was higher but New York was lower, due largely to the decline in silver, and all positions could be obtained at 46.50c. Today there was also a further slump in the London market of £10 per ton, with spot Straits quoted at £260 per ton, the same position being quoted in New York at 45.50c. per lb. The present London price is a decline of £20 per ton in the week and the New York price is the lowest in many months and compares with the fixed Government price at the close of the war and some months later of 72.50c., New York. Sales during the week have been very light, or less than 300 tons, at prices ranging from 46.25c. to 48.37½c. for future shipment, depending upon the position. Chinese No. 1 tin for April-May-June shipment was sold for 43c. Arrivals thus far this month have been 1915 tons, with the quantity afloat 4645 tons.

Lead.—The only change in the market is the fact that spot lead, New York, is easier. It can be bought with no difficulty at 9c. and can be had under this at 8.87½c., New York, but it is not generally offered at the latter figure. Lead in transit is offered at 8.87½c., New York. We quote the market for early or 30-day delivery at 8.50c., St. Louis, or 8.75c. to 8.85c., New York, but there is no inclination on the part of consumers to make purchases. Lead is coming in much more freely, however, indicating some improvement in the railroad situation, but consumers have no faith in present prices.

Zinc.—This market is still under the adverse influences which have prevailed for the last 60 days. Prices are being made mostly by dealers and those who trade in resale export metal. Producers are not interested in prevailing quotations and are only making sales to favored customers at the quotations prevailing at the time. Domestic demand is exceedingly light, due to the general conditions of the industry, but prices are fairly firm around present levels, although predicted by some to go considerably lower before they go higher. Prime Western for delivery in the next two or three months is generally quoted at 7.55c., St. Louis, or 7.90c., New York.

Antimony.—In sympathy with the severe decline in silver, antimony has also declined and is now quoted, duty paid, New York, at 7.75c. for wholesale lots for early delivery, with the better grades quoted at 7.87½c. to 8c.

Aluminum.—Wholesale lots for early delivery of virgin metal, 98 to 99 per cent pure, are quoted at 33c., New York, by the leading interest, but by other sellers at 31.50c.

Old Metals.—The week has shown another small decline in values, though the tendency of many holders is to wait for a reaction. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	18.50
Copper, heavy and wire	17.25
Copper, light and bottoms	15.00
Brass, heavy	13.25
Brass light	9.00
Heavy machine composition	18.00
No. 1 yellow rod brass turnings	10.75
No. 1 red brass or composition turnings	15.00
Lead, heavy	7.75
Lead, tea	6.00
Zinc	5.75

Chicago

JUNE 14.—The non-ferrous metal markets are quiet, with little change in prices. Antimony has declined to 9c. We quote Lake copper 19.25c. for car-loads, tin 51c. to 52c., lead 8.65c., spelter 7.75c., and antimony 9c. On old metals we quote copper wires, crucible shapes, 13.25c.; copper clips, 13.75c.; copper bottoms, 11.25c.; red brass, 3.75c.; yellow brass, 9c.; lead pipe, 6.50c.; zinc, 4.25c.; pewter, No. 1, 30c.; tin-foil, 35c., and block tin, 40c., all these being buying prices for less than carload lots.

St. Louis

JUNE 14.—The non-ferrous markets have been quiet except tin which has been in a rather uncertain state. Local dealers are still holding small lots at 60c., although large quantities are reported as available elsewhere as low as 49c. Receipts are not sufficient at this point, dealers hold, to justify any recognition of the conditions elsewhere. Lead is quoted in car lots at 8.50c. to 8.75c.; less than car lots, 9c.; spelter, car lots, 8c. to 8.25c.; less than car lots, 8.50c. to 8.75c.; copper, 20c.; antimony, 11c. In the Joplin district zinc ores were no stronger, while lead was fairly well held. On miscellaneous scrap metals we quote dealers' buying prices as follows: Zinc, 9c.; heavy yellow brass, 10.50c.; heavy red brass, 15c.; heavy copper and copper wire, 15.50c.; light copper, 13c.; pewter, 35c.; tin-foil, 43c.; zinc, 4.50c.; lead, 6c.; tea lead, 3.50c.; aluminum, 24c.

C. W. Carter, formerly vice-president Berger & Carter Co., and W. A. Folger, late manager Pacific Tool & Supply Co., San Francisco, have entered the machinery import and export field with offices at 40 California Street. They are acting as direct factory representatives and are interested in high-grade machine tools, canning machinery, food preserving machinery, iron and steel, high-speed and carbon steel and shop supplies. Catalogs are desired.

The West Pullman, Ill., plant of McCord & Co. has been closed indefinitely following demands from workmen in the foundry which the management considers unreasonable. The company has two other plants at Detroit.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, with revisions effective from Jan. 1, 1920, in carload lots, to points named, per 100 lb., are as follows:

New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 17c.; Cincinnati, 23½c.; Indianapolis, 24½c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; all in carloads, minimum 36,000 lb. To Denver the rate is 99c., minimum carload 40,000 lb.; Omaha, 59c., minimum carload 36,000 lb.; New Orleans, 38½c.; minimum carload 36,000 lb.; Birmingham, 57½c., minimum carload 36,000 lb. To the Pacific Coast the rate is \$1.25 per 100 lb. on articles of iron and steel, minimum carloads 80,000 lb., while the structural steel rate is \$1.25, minimum carload 50,000 lb., or \$1.315, minimum carload 40,000 lb. The rate on ship plates, Pittsburgh to Pacific Coast, is \$1 per 100 lb., minimum carload 80,000 lb. On wrought iron and steel pipe, the rate from Pittsburgh to Kansas City is 56c., to St. Paul, 49½c.; to Denver, 99c.; to Omaha, 56c., all in carload lots, minimum 46,000 lb. To Jacksonville, Fla., all rail carloads, 41½c., minimum 36,000 lb., less than carloads, 59c.; rail and water, carloads 34½c., minimum 36,000 lb.; less than carloads 46½c. On iron and steel items not noted above, the rates vary somewhat, and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural size, 2.45c. to 4c.

Wire Products

Wire nails, \$3.25 to \$4 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.50 and shorter than 1 in., \$2. Bright basic wire, \$3 to \$3.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3 to \$3.50; galvanized wire, \$3.70 to \$3.95; galvanized barbed wire and fence staples, \$4.10 to \$4.45; painted barbed wire, \$3.40 to \$3.75; polished fence staples, \$3.40 to \$4.50; cement-coated nails, per count keg, \$2.85 to \$3.75; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....\$4.50 base
Large boiler rivets.....4.60 base
Small rivets.....40 per cent off list
Small machine bolts, rolled threads, .40 and 5 per cent off list
Same sizes in cut threads.....40 and 10 per cent off list
Longer and larger sizes of machine bolts..30 per cent off list
Carriage bolts, ¾ in. x 6 in.:
 Smaller and shorter, rolled threads, .30 and 10 per cent off list
 Cut threads.....30 per cent off list
 Longer and larger sizes.....25 per cent off list
Lag bolts.....45 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....40 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ¾ in. x 4 in.:
 Smaller and shorter.....30 per cent off list
 Longer and larger sizes.....20 per cent off list
Hot pressed and cold pressed sq. or hex. blank nuts.....\$1.50 off list
Tapped nuts.....\$1.00 off list
Semi-finished hex. nuts, U. S. S. and S. A. E.:
 5/16-in. and larger.....50 and 10 per cent off list
 9/16-in. and smaller.....50 and 10 per cent off list
 9/16-in. and smaller, A. L. A. M. or S. A. E.,
 70, 10 and 5 per cent off list
Stove bolts in packages.....70 and 10 per cent off list
Stove bolts in bulk.....70, 10 and 2½ per cent off list
Tire bolts.....55 and 10 per cent off list
Track bolts.....6c. base
 One cent per lb. extra for less than 200 kegs. Rivets in
100-lb. kegs 25c. extra.
All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$52 to \$70; chain rods, \$75 to \$80; screw rivet and bolt rods and other rods of that character, \$65 to \$70. Prices on high carbon rods are irregular. They range from \$75 to \$100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ to 9/16 in. and larger, \$4 per 100 lb. In lots of 200 kegs of 200 lb. each or more; spikes, ½-in. and 7/16-in., \$4.25; 5/16-in., \$5; track bolts, \$4.90 to \$5. Boat and barge spikes, \$4.50 per 100 lb. In carload lots of 200 kegs or more, f.o.b. Pittsburgh. Tie plates, \$3 to \$4 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$13.80 per package; 8-lb. coating, I. C., \$14.10; 12-lb. coating, I. C., \$15.80; 15-lb. coating, I. C., \$16.80; 20-lb. coating, I. C., \$18.05; 25-lb. coating, I. C., \$19.30; 30-lb. coating, I. C., \$20.30; 35-lb. coating, I. C., \$21.30; 40-lb. coating, I. C., \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 4c. from mill. Common bar iron, 4.50c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, discounts on steel pipe applying as from Jan. 14, 1920, and on iron pipe from Jan. 7, 1920:

Steel		Butt Weld		Iron	
Inches.	Black Galv.	Inches.	Black Galv.	Inches.	Black Galv.
1/8, 1/4 and 3/8	47 20 1/2	1/8 and 3/4	1 1/2 + 25		
1/2	51 36 1/2	1/2	25 1/2 + 1 1/2		
5/8 to 3	54 41 1/2	1/2	29 1/2 11 1/2		
		3/4 to 1 1/2	34 1/2 18 1/2		
		2 and 2 1/2	33 1/2 17 1/2		

Steel		Lap Weld		Butt Weld, extra strong, plain ends	
Inches.	Black Galv.	Inches.	Black Galv.	Inches.	Black Galv.
2	47 34 1/2	1 1/2	24 1/2 9 1/2		
2 1/2 to 6	50 37 1/2	1 1/2	31 1/2 17 1/2		
7 to 12	47 33 1/2	2	28 1/2 14 1/2		
13 and 14	37 1/2	2 1/2 to 6	30 1/2 17 1/2		
15	35	7 to 12	27 1/2 14 1/2		

Steel		Lap Weld, extra strong, plain ends		Butt Weld, extra strong, plain ends	
Inches.	Black Galv.	Inches.	Black Galv.	Inches.	Black Galv.
1/8, 1/4 and 3/8	43 25 1/2	1/4	+ 7 + 40		
1/2	48 35 1/2	2	23 1/2 6 1/2		
5/8 to 3	52 39 1/2	2 1/2 to 1 1/2	28 1/2 15 1/2		
	53 40 1/2	2 and 2 1/2	34 1/2 19 1/2		

Lap Weld, extra strong, plain ends

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipes have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		Charcoal Iron	
3 1/2 to 4 1/2 in.	40 1/2	1 1/4 and 1 1/2 in.	+ 20
2 1/2 to 3 1/4 in.	30 1/2	2 and 2 1/2 in.	+ 10
2 1/2 in.	24	2 1/2 and 2 1/2 in.	+ 1
1 1/2 to 2 in.	19 1/2	3 and 3 1/4 in.	- 1 1/2
		3 1/2, 4 and 4 1/2 in.	- 8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in.	\$327
1 1/4 in.	267
1 1/2 in.	257
1 1/2 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carloads and larger lots for indefinite delivery are given in the left-hand column. For reasonably prompt delivery, mills have no trouble in getting prices quoted in the right-hand column, or even higher prices.

Blue Annealed—Bessemer

No. 8 and heavier	3.50 to 6.95
Nos. 9 and 10 (base)	3.55 to 6.00
Nos. 11 and 12	3.60 to 6.05
Nos. 13 and 14	3.65 to 6.10
Nos. 15 and 16	3.75 to 6.20

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21	4.15 to 6.30
Nos. 22 to 24	4.20 to 6.35
Nos. 25 and 26	4.25 to 6.40
No. 27	4.30 to 6.45
No. 28 (base)	4.35 to 6.50
No. 29	4.45 to 6.60
No. 30	4.55 to 6.70

Galvanized Black Sheet Gage—Bessemer

Nos. 10 and 11	4.70 to 7.50
Nos. 12 to 14	4.80 to 7.60
Nos. 15 and 16	4.95 to 7.75
Nos. 17 to 21	5.10 to 7.90
Nos. 22 to 24	5.25 to 8.05
Nos. 25 and 26	5.40 to 8.20
No. 27	5.55 to 8.35
No. 28 (base)	5.70 to 8.50
No. 29	5.95 to 8.75
No. 30	6.20 to 9.00

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16	4.15 to 6.15
Nos. 17 to 21	4.20 to 6.20
Nos. 22 to 24	4.25 to 6.25
Nos. 25 to 27	4.30 to 6.30
No. 28 (base)	4.35 to 6.35
No. 29	4.40 to 6.40
No. 30	4.40 to 6.40
Nos. 30 1/2 and 31	4.45 to 6.45

BELGIUM BUYING IN GERMANY

**A Numerous Group Awaiting for Lower Prices
—Coal from United States**

(*Special Correspondence*)

BRUSSELS, BELGIUM, May 29.—The iron and steel market in Belgium continues to be marked by heavy buying of all kinds of material at almost any price demanded. It is evident, however, that the buyer purchase at present prices chiefly because he is acutely in need of the material to continue in operation and would hesitate to buy in many cases if he could possibly do without.

Despite the generally heavy buying, there is a faction of buyers which is not paying the high prices, preferring to delay as long as possible in the hope that prices will show a decrease; and as an incentive to this group, a slight drop in present prices is appearing, which would probably be even greater were it not for the indispensable character of much of the work for which the material is purchased. This group includes both manufacturers and builders, who argue that arrivals of German fuel, lightening of traffic conditions, increased coal mining in Belgium and in the new mines of the Bassin du Limbourg combined with the return of confidence in the future that is following in the wake of these basic changes will tend to bring prices to a lower level. It is also pointed out that predictions of prices for the future must be based upon the

number of furnaces in blast and that as the market is much easier than at any time since the armistice a check in high prices is the next thing to be considered. The only unknown factor, according to this group of buyers, is the fact that to a great extent Belgium is dependent upon France for ore and upon Germany for fuel.

The result of the prevailing high prices has been to force foreign buyers and many Belgian buyers to place orders in Germany at considerably lower prices, principally for bars, which were recently quoted in Belgium at 1225 francs. According to reports Belgium is not receiving as much of the fuel allocated to her in the German indemnity as has been supposed. In March 9369 tons of coke and 1299 tons of coal were received, against 25,069 tons shipped to Holland. The Belgians point out that although the March receipts of coal and coke are in excess of the imports from Germany in 1913, there are now numerous new industries to be provided for, such as a glass district in Hainaut and potteries near St. Chislain.

Fuel from United States

Recent large shipments of fuel from the United States have occasioned great surprise and the rise in the exchange rate has brought many to hope for the possibility of contracts with American firms for continued shipments of coal. Shipping concerns in Antwerp are investigating this possibility with the intention of making arrangements for a guaranteed monthly tonnage of fuel from the United States.

Steel Companies Bring Suit Against Federal Trade Commission

Washington, June 15.—Twenty-two iron and steel companies have joined in a suit in the Supreme Court of the District of Columbia to restrain the Federal Trade Commission from further attempts to collect monthly cost statistics. Justice Bailey has issued a temporary restraining order preventing the commission from instituting suits to compel compliance with its orders relative to furnishing data regarding cost of production, and also against its demanding further information. A hearing will be held on June 21 to determine whether the injunction shall be made permanent.

The Supreme Court of the District of Columbia already has decided in the case of the Maynard Coal Co. vs. the Federal Trade Commission that it lacks authority to require information of this nature. The commission, however, has failed to act in compliance with the Maynard decision except with respect to the coal companies. Suits have been brought by the commission against the Republic Iron & Steel Co. and the Bethlehem Steel Co. to compel them to comply with its demands for monthly reports of production. The suit brought by the steel companies is designed to prevent the commission from bringing mandamus suits against other companies.

The Maynard Coal Company case has not as yet been appealed to the Supreme Court of the United States by the commission. The present litigation, it is expected, will be taken to the Supreme Court for an early decision.

The companies which are complainants in the new case are the following: Claire Furnace Co., Ella Furnace Co.; Reliance Coke Co.; Westmoreland Connellsville Coal & Coke Co.; Weirton Steel Co.; Edgewood Steel Co.; La Belle Iron Works; Donner Steel Co., Steel & Tube Company of America, Midvale Steel & Ordnance Co., Cambria Steel Co., Republic Iron and Steel Co., McKeesport Tin Plate Co., N. & G. Taylor Co., Inland Steel Co., Trumbull Steel Co., Bethlehem Steel Co., Youngstown Sheet & Tube Co., Brier Hill Steel

Co., West Pennsylvania Steel Co., Wheeling Steel & Iron Co. and Sharon Steel Hoop Co.

Worthington Corporation Enters Motorship Machinery Field

The Worthington Pump & Machinery Corporation, 115 Broadway, New York, announces that it has completed preparations for the production of motorship machinery and complete engine room equipment. By motorships, it is explained, is meant deep water ships of large tonnage, propelled by direct-connected reversible four-cycle Diesel engines of some thousand horsepower.

A new all American design of Diesel main propelling engine has been developed and is being subjected to tests at the company's Snow-Holly Works, Buffalo. This is a 2400-I. hp. 6-cylinder marine Diesel engine, 29-in. bore, 46-in. stroke, 120 r.p.m., and will be followed by such other sizes as American ships may require.

Engine room auxiliaries involving pumps, air compressors, and auxiliary oil engines, generating electric current for all ship purposes will also be manufactured. A complete electrical system with a full line of electrical apparatus especially adapted for motorship service conditions, and to Worthington engine room units, is being developed by the General Electric Co.

The American Rolling Mill Co., Middletown, Ohio, through President Geo. M. Verity, announces the presentation by the company to the Middletown Public Library of an extensive list of technical books on iron and steel metallurgy and processes. The addition of these books will make the Middletown Library second to none in the State of Ohio.

The proposal to create a Government department of public works failed to receive approval in a referendum among the membership of the Chamber of Commerce of the United States.

John D. Reynolds and Percival van R. Harris, welding engineers, have formed a partnership, trading as Atlantic Welding Works, Thirtieth and Spring Garden streets, Philadelphia.

The sixth National Exposition of Chemical Industries will be held in the Grand Central Palace, New York, during the week of Sept. 20.

INCREASE IN STEEL INGOTS

A Ten Per Cent Gain in May—Yearly Rate 41,400,000 Tons to June 1

The statistics of steel ingot production in the United States in May, just published by the American Iron and Steel Institute, show an increase of nearly 10 per cent over the output in April, which in turn was 16 per cent less than that of March. The figures furnished by 30 companies which made about 84 per cent of the country's steel ingot production in 1918 gave a total of 2,883,164 gross tons for May against 2,638,305 tons in April. Counting 26 working days, the May total represents 110,891 tons per day for the 84 per cent. If the remaining 16 per cent produced at a corresponding rate, the total output of the country in May was 3,431,113 tons, or 131,966 tons per day.

The figures below from the monthly report of the American Iron and Steel Institute show the distribution as between Bessemer and open-hearth steel ingots. Statistics were not gathered in September, 1919, the first month of the steel strike or in the three months following.

Monthly Production of Steel Ingots of Companies Producing 84.03 Per Cent of Total in 1918—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1919	2,351,153	749,346	7,279	3,107,778
February	2,043,635	655,206	5,842	2,704,683
March	2,100,528	555,332	6,405	2,662,265
April	1,732,447	500,770	6,494	2,239,711
May	1,506,015	414,392	8,617	1,929,024
June	1,692,257	521,634	5,328	2,219,219
July	1,875,630	625,246	7,300	2,508,176
August	1,988,651	748,212	9,218	2,746,081
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164

The ingot production of the 30 companies reporting was 14,653,744 gross tons in the first five months of the year. This represents for all the steel companies of the country an annual rate of approximately 41,400,000 tons of ingots, which is surprisingly large in view of all the handicaps of the year.

Steel Companies Buy Cars

The Youngstown Sheet & Tube Co. has placed an order with the Cambria Steel Co. for 500 70-ton hopper cars for delivery starting in August. This order is in line with the policy of some of the steel companies to purchase their own railroad equipment to carry coal and coke to supply their own needs. The McKinney Steel Co., Cleveland, recently placed an order for 500 hopper cars.

The monthly meeting of the Pittsburgh Foundrymen's Association, scheduled for Monday, June 21, will take the form of an annual outing and ladies' day, to be held at The Pines, a resort near Pittsburgh. There will be a program of sports, which will include a baseball game between the foundrymen and the supply men, and dinner will be served at 6:30 P. M. George D. McIlvain of Pittsburgh, secretary of the National Pipe & Supplies Association, will give an extemporaneous talk on "Co-operation."

To assist French purchasers seeking American goods and to help the American export trade in general, the American Chamber of Commerce in France, Inc., 32 Rue Taitbout, Paris, France, has established a catalog file. A manufacturer on the payment of the annual fee of \$10 is entitled to have catalogs on file and also to be listed under ten different headings in the catalog index.

D. M. Petty, electrical superintendent Bethlehem Steel Co., South Bethlehem, Pa., read a paper on "Some Advantages of Inter-connection Between Industrial Power Systems," at the meeting of the Pittsburgh section of the American Institute of Electrical Engineers held in Pittsburgh, June 8.

The Ferro Alloy Co., Denver, Col., manufacturers of ferroalloys, advises that it has started the manufacture of ferromanganese in the electric furnace.

SHORT TRADE ITEMS

New steel rails and relaying rails in weights of 12, 35 and 60 lb. per yard are inquired for by William H. Davis, doing an exporting and importing business with offices in the Chronicle Building, San Francisco. Mr. Davis says he can furnish an irrevocable letter of credit available at San Francisco, Chicago or any point by agreement, and desires information as to the tonnage available for sale.

The Buda Co., manufacturer of industrial motors and trucks, Harvey, Ill., has completed a foundry for casting small parts for the Buda four-cylinder engine for trucks and tractors. The plant was built and equipped 30 days after the lease for the property had been signed.

To construct, install, operate and sell artificial gas producing equipment, the Central Gas & Fuel Co. has been formed at Youngstown, Ohio, with a capital of \$1,000,000. W. E. Elliott is the inventor of the patented process that will be used. He supervised installation of one of the six batteries of the Youngstown Sheet & Tube Co.

The Yale & Towne Mfg. Co., Stamford, Conn., has purchased the industrial electric truck division of the C. W. Hunt Co., Staten Island. The purchaser will combine this newly-acquired business with its hoist department and will thus furnish complete equipment for the moving of light loads, either vertically or horizontally.

The Keystone Machine & Engineering Co., Pittsburgh, has applied for a charter and proposes to engage in the manufacture of steel castings and forgings. The plans of the company are not yet fully developed.

The Blaw-Knox Co., Pittsburgh, has nearly completed the installation of a new welding plant at its works at Hoboken, Pa. The company has already received a considerable number of orders for this new department, which it expects to have in full operation in a short time. Recently the name, Hoboken, was legally changed to Blaw-Knox, in honor of this concern, whose large plant is the main industry in the town.

The General Metals Co., Detroit, has completed arrangements for eastern representation for its Trundle multiple automatic thread miller. Harold A. Wright, 201 Devonshire Street, Boston, represents the tool in all of New England except Connecticut, which will be covered by Barbour, Love & Woodward, New York.

The Standard Tank Car Co., Sharon, Pa., in May, turned out over 700 new steel cars of various types, the largest output of cars in any one month in its history. On one day recently the company made a shipment of 125 tank cars.

The Ajax Car & Mfg. Co., Cleveland, has taken an order from the Koppers Co. for coke pushers, leverers, quenching cars and door lifting equipment for use in connection with the new by-product coke plant that is being erected by the Koppers Co. in Chicago.

The Hitner-Wharton Co., 1524 Chestnut Street, Philadelphia, was organized some months ago as sales agent and engineer for mechanical and industrial supplies and equipment. The members are Richard Morris Hitner and Elbert B. Wharton. Heretofore the company has been handling used machinery and materials exclusively and is now expanding into a sales organization for new equipment.

The annual report of the Dominion Steel Corporation for the year ended March 31 shows surplus after charges, taxes and preferred dividends of \$2,281,613, as compared with surplus of \$5,470,468 in the preceding year.

PERSONAL

J. W. Dickson, who has long been associated with E. W. Mudge & Co., in Pittsburgh, in charge of pig iron and steel sales, has been elected vice-president of Park & Williams, Inc., Philadelphia, dealers in pig iron, ferromanganese, ferrosilicon, coal, coke and steel, and is in charge of the office opened by the firm, June 15, at 509 Oliver Building, Pittsburgh.

Gen. George W. Goethals completed in the past week the organization of a new firm of engineers, designers and managers of construction, under the name of Goethals, Wells & Co., Inc., with offices at 40 Wall Street, New York. The firm gives a complete engineering service in connection with projects of a broad engineering character. This includes the consulting and co-operative services of two associated companies, George W. Goethals & Co., Inc., consulting engineers and managers of corporations, and Carney & Lindemuth, 40 Wall Street, New York, metallurgists and consultants in iron and steel.

Lieut. Col. Thomas F. Brown, formerly of the Ordnance Department, U. S. A., has been elected president of the Colonial Brass & Bronze Co., Middleboro, Mass.

H. Coulby, president Pittsburgh Steamship Co., and William McLaughlan, formerly of Pickands, Mather & Co., Cleveland, will sail for Europe on June 19.

At a meeting of the board of directors of the Yale & Towne Mfg. Co., Stamford, Conn., on May 27, the resignation of John B. Milliken as treasurer was accepted. Willard L. Case was elected to succeed him, Mr. Case's long experience has involved relations with power and light companies, foundries, and machine shops. Edward C. Waldvogel with the company for 15 years and general manager for four years, having charge of all sales and advertising, was elected a director.

J. K. Alline, formerly of the Electric Appliance Co., Chicago, is now Iowa representative for the Packard Electric Co., Warren, Ohio, manufacturer of transformers and automotive cable.

Arthur G. McKee, Arthur G. McKee & Co., Cleveland, sailed a few days ago for Europe where he will spend four months in connection with contracts taken by his company.

At the annual meeting of the Westinghouse Electric & Mfg. Co., the directors were re-elected, with the exception that G. W. Davison was elected a director to succeed the late J. N. Wallace.

At a recent meeting of the board of directors of the Watson-Stillman Co., several changes in personnel were made, due to the retirement of A. F. Stillman from active interest in the management. E. A. Stillman remains as president, and also has full supervision of the sales. Carl Wigtel, chief engineer, was elected vice-president, J. D. Brocks, treasurer, and A. Parker Nevin, secretary. LeRoy T. Brown was appointed works manager; J. W. Delano, assistant works manager, and W. H. Martin, purchasing agent. The offices of general manager and superintendent are discontinued, and G. D. Kershaw and J. F. Lary who held these positions are no longer connected with the company. The board now consists of E. A. Stillman, A. F. Stillman, Carl Wigtel, A. Parker Nevin, W. L. Wright, president, Savage Arms Co.; George T. Ordway, of Betram Griscom Co., and F. A. Hutson.

Glenn L. Orr has been elected secretary, treasurer and general manager of the Lansing Foundry Co., Lansing, Mich., to succeed S. B. Spalding, resigned to go into other business. Mr. Orr was formerly with the Hupp Motor Car Corporation, Packard Motor Car Co. of Detroit, and the Briscoe Motor Car Corporation, Jackson, Mich.

The new executive personnel of the Dodge Brothers Co., Detroit, has been announced as follows: President

and treasurer, Horace E. Dodge; F. J. Haynes, vice-president and general manager; Arthur T. Waterfall, assistant general manager; Preston G. Findlay, director of traffic; R. H. Allen, director of purchases; Charles W. Matheson, acting sales manager. Howard Bloomer, attorney for the company, is made a member of the directorate.

S. W. Katzenstein has been made manager of the Antrim Iron Co.'s plant at Mancelona, Mich., succeeding N. M. Langdon, resigned.

F. R. Bolles has been appointed vice-president and general manager of the American Automatic Connector Co., of Cleveland, following his resignation as vice-president and general manager of the Copper Range Railroad, with headquarters at Houghton, Mich.

Grandon D. Gates, assistant works superintendent of the Celluloid Co., Newark, N. J., has recently resigned to become associated with the Davis-Watkins Dairymen's Mfg. Co., as general manager of its Derby, Conn., plant.

Carl Wigtel, vice-president and chief engineer of the Watson-Stillman Co., sailed June 14, for a ten weeks' trip to the Scandinavian countries. He also expects to visit England, France, Belgium and Holland. While Mr. Wigtel is going mainly for a vacation, this being his first trip to his old home in Norway, since his connection with the Watson-Stillman Co., thirty-three years ago, he will also investigate new developments in the line of hydraulic machinery in all of the above countries.

Richard M. Neustadt, who has been associated with Dudley R. Kennedy, Philadelphia, counselor on labor, employment and industrial relations problems, will leave July 15 for Sacramento, Cal., as consultant on personnel and organization work.

J. E. Jennings, vice-president, Milliken Brothers Mfg. Co., Woolworth Building, New York, sailed for England on the "Lapland," June 12, for an extended business trip.

William R. Marshall has been appointed manager of the industrial division of the Westinghouse Electric & Mfg. Co., in the New York office, to succeed Harlan A. Pratt, who has resigned to become sales manager of the Atlantic Elevator Co., New York.

Henry J. Smith, for some time connected with the Boston office of W. J. Breen & Co., pig iron, will represent that company in the selling field of New England beginning July 1.

Joseph A. Gurney, Arrott Building, Pittsburgh, for six years Pittsburgh district manager of the United States Radiator Corporation, Detroit, has resigned to become Pittsburgh representative of the Barber-Greene Co., Aurora, Ill., manufacturer of belt conveyors and self-feeding bucket loaders.

William A. Bennett has resigned from the engineering department of the Automatic Sprinkler Co., at Youngstown, Ohio, to become assistant city engineer of Youngstown, succeeding E. B. Milligan, who has become associated with the International Steel Co., Cleveland.

The American Manganese Steel Co., Chicago, announces that Walter Brinton, who was manager at its New Castle, Del., plant for several years, has been elected vice-president of the company.

J. G. Esslinger, representative in the Orient, for Mayer & Lage, Inc., exporters and importers, 120 Broadway, New York, will sail from San Francisco, Cal., July 8 for Kobe, Japan.

Walter J. Garrity, New York, has been appointed representative of the Reed Small Tool Works, Worcester, Mass., for the Atlantic Coast territory.

F. B. Winslow, chemist, Millbury Steel Foundry Co., Millbury, Mass., has been made superintendent to succeed O. K. Carpenter, resigned.

F. Edward Dea has resigned as director, auditor, treasurer and secretary of the Rowe-Calk & Chain Co., Southington, Conn.

Dale Wolf, director of employment and service of the Miller Lock Co., Philadelphia, is now engaged in

personnel work with F. & R. Lazarus & Co., Columbus, Ohio.

A. D. Mellor of Mellor & Hamburger, New York, engineering sales agents of the Berger Mfg. Co., Canton, Ohio, has been appointed export manager of the company at its New York office, 516-24 West 25th Street.

Stanley P. Rockwell has resigned as vice-president of Weekes-Hoffman Co., Syracuse, N. Y., to become metallurgist at Whitney Mfg. Co., Hartford, Conn.

Milwaukee Electric Crane & Mfg. Co., Milwaukee, Wis., announces the appointment of R. K. Morse as western manager, with offices in the Pittock Block, Portland, Ore.

Chas. H. Small, senior member of Small, Shadé & Co., Monadnock Building, San Francisco, has withdrawn his interests from that firm, and is contemplating handling the sale of railway and industrial supplies under his own account.

At the annual meeting of the Engineers' Club of Dayton, Ohio, C. F. Kettering was elected president; E. A. Deeds, vice-president; W. D. Krebs, secretary, and Edward Wuichet, treasurer.

Edgar S. Genstein is now metallurgist for the Treadwell Engineering Co., Easton, Pa., having resigned his former connection as engineer of tests of the U. S. Naval Ordnance plant, South Charleston, W. Va.

George P. Mills, formerly electrical sales engineer General Electric Co., Philadelphia, has joined the staff of the Electric Furnace Construction Co., Philadelphia, to take charge of, and specially develop electrical industrial heating furnaces.

J. P. Catlin, engineer motor department, General Electric Co., Pittsfield, Mass., works, has been made managing engineer, motor division, Bridgeport plant, Bridgeport, Conn. Mr. Catlin is succeeded by Neil Currie, Jr., at the Pittsfield works.

R. Sanford Riley, president Sanford Riley Stoker Co., Ltd., Worcester, Mass., has been elected president of the Stoker Manufacturers Association. He is also president of the Murphy Iron Works, Detroit.

J. W. McQueen, president Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., is on a trip through the Rocky Mountains and along the Canadian Pacific. He expects to be absent several weeks.

J. H. Windle, Providence, R. I., selling agent Woonsocket Machine & Press Co., Inc., Fales & Jenks Machine Co. and the Easton & Burnham Machine Co., has returned from a six weeks business trip to Japan and China.

W. C. Murphy, treasurer Providence Mill Supply Co., Providence, R. I., has returned from a three months business trip to Japan and China.

T. W. McManus, master mechanic for the Kellogg Switchboard & Supply Co., Chicago, for the past six years, has been elected vice-president of the Security Tool Works, Chicago, and has assumed the duties of general manager.

The Gandy Belting Co., Baltimore, announces the appointment of Fielder I. Schillinger, Jr., to the position of general sales manager, succeeding Charles H. Dankmeyer, resigned. The recently opened Chicago branch at 549 West Washington Street will be under the charge of H. Milton Michel, who comes from the New York branch, 36 Warren Street.

D. Clinton Grove, formerly with the Diehl Mfg. Co., Elizabeth, N. J., and later with the Ingersoll-Rand Co., New York, has become advertising manager of the Blaw-Knox Co., Pittsburgh, succeeding George E. Land. Mr. Land has organized the Technical Publication Co., 202 Nixon Building, Pittsburgh, to engage in advertising service.

J. P. Begley has been made chief chemist of the American Steel Foundries, with headquarters at St.

Louis. He will have charge of all the laboratories. He was formerly identified with the Davis wheel department of the same company.

Lawrence H. Weaver will succeed C. Harold Putnam as head of the malleable iron department, No. 2 mill, International Harvester Co., Auburn, N. Y. Mr. Putnam will become assistant treasurer and manager of the Malleable Iron Works, New Britain, Conn., whose sale was mentioned in THE IRON AGE of June 10.

A. H. Mitchel and E. R. Abbott have resigned from H. W. Cotton, Inc., and become associated with the Coe-Stapley Mfg. Corporation, Boston, in charge of the contract sales department, with headquarters at the New York office, 136 Liberty St. The Coe-Stapley Mfg. Corporation is a producer of sheet metal products.

F. L. Estep, of the consulting engineering firm of Perin & Marshall, 2 Rector St., New York, has returned from a six weeks' absence in England, Scotland and Wales.

Craig Adair, formerly vice-president of Penn Seaboard Steel Corporation, and Paul Day of the same company have resigned and have formed the Adair Corporation. They will handle iron and steel products and mechanical specialties, with offices at 1205 Widener Building, Philadelphia.

OBITUARY

LEONARD B. MALLORY, assistant purchasing agent, the American Hardware Corporation, New Britain, Conn., died suddenly, June 10. Mr. Mallory was born in New Britain, and was 48 years old. He was educated in New Britain schools, leaving the high school in December, 1887, to take a place in P. & F. Corbin's office as errand boy. Later, he worked in the accounting department and about 25 years ago entered the purchasing department. When the American Hardware Corporation was formed and the buying centralized, he assumed the place which he held to the day of his death. He had many friends. He was kindly in disposition, pleasant in manner, and eminently fair in all his dealings.

EDWARD M. DART, founder of the E. M. Dart Mfg. Co., Providence, R. I., died in his eighty-sixth year on June 5, while at his summer home, Shawomet Beach, R. I. He was born Jan. 19, 1835, in New London, Conn., where he received his schooling, and, after gaining mechanical experience in companies in that city, he entered the employ of Law & Kannon, Providence, manufacturers of gas-piping and fixtures. In 1858 he became connected with the Providence Steam & Gas Pipe Co. and later went to the Mason Machine Works, Taunton, Mass. He subsequently worked for the firm of Hudson & Wood and the Perkins Horse Shoe Co., both of Providence. In 1866 he established his own business of manufacturing pipe and fittings, which grew until in 1894 he formed the E. M. Dart Mfg. Co.

OTTO ARLT, a well-known and well-regarded sales representative in New York, of Rogers, Brown & Co., 30 Church Street, died Sunday, June 13, at Saranac Lake, N. Y., where he had been since April, 1919. He was about 43 years old and leaves his wife and a son. Mr. Arlt had been connected with Rogers, Brown & Co. since 1905.

WILLIAM A. LANIGAN, treasurer, Davis Iron Foundry, Emerson Mfg. Co., and Lawrence Machine Co., all of Lawrence, Mass., died suddenly June 11, in the office of the Davis Iron Foundry, of heart trouble. Mr. Langan was 37 years old and had lived all his life in Lawrence. His father, James F., is principal owner of the three above mentioned companies.

LOUIS FRANCIS YOUNG, senior member of the firm of Vaile & Young, Baltimore, manufacturers of ornamental iron, cornices, roofing, etc., died on June 6 at his home in Baltimore, aged 70 years.

Machinery Markets and News of the Works

MORE PRICE ADVANCES

Less Inquiry and Buying by Automotive Industries

Exporting of Machinery More Voluminous Than Domestic Business in One Center—Several Lists of About 25 Tools

Prospects of continuous railroad buying for some time to come is the outstanding feature of an otherwise dull market. Outside the carriers, chief inquiries are for single tools for replacements for quick delivery. There is a lessening of buying by the automotive industries and one Detroit maker of automobile parts has cancelled his order. The inquiry of the Rock Island railroad is the most important before the trade in Chicago. Practically all of the equipment on the list of the Chesapeake & Ohio has been covered and this railroad may have another list out for a new shop in the fall.

Though the halt in buying is often attributed to

the belief of would-be purchasers that the peak has been reached, prices continue to advance, as instanced by a 15 per cent increase by a maker of hand screw machines; a 10 per cent increase by a manufacturer of engine lathes and upright drills; and by a 10 per cent rise in one make of pipe threading and cutting machines.

From Boston it is reported that while domestic business is on the decline, export business is satisfactory. One Connecticut lathe builder sold 27 machines to British interests last month and has prospects for as large a sale to the French this month.

Among the larger inquiries for tools are those of the West India Sugar Finance Corporation, New York, which is about to close for 20 machines; the General Fire Extinguisher Co., Providence, R. I., which has ordered several special design tools and is considering the purchase of several lathes for quick delivery; the Cleveland Hardware Co., Cleveland, which is asking for 20 single-spindle drilling machines; the American Motor Cycle Co., Columbus, Ohio, which is asking for 25 tools.

New York

NEW YORK, June 15.

The dullness which has characterized the machine-tool market the past few weeks continues. Some in the trade say that last week was one of the quietest experienced in a long time. Many representatives of machine-tool builders were in attendance at the American Railway Association conventions at Atlantic City, N. J. The principal buying was by the General Electric Co., but nothing has been purchased as yet against the list of about 30 tools mentioned in this column last week. The West India Sugar Finance Corporation, New York, is about to close for 20 machines.

Those in the trade who are in closest touch with the railroads predict there will be continuous buying by the carriers for some time to come. The needs of the roads are well known, and it is only a question of financial and other arrangements being made to bring a great deal of this business into the market.

The slackness of the past few weeks continues in the crane business, new inquiries being few and competition strong, although most manufacturers are well filled up and unable to promise early delivery. Manufacturers of coal bridges and other coal handling machinery report a good demand, but inquiries and orders for electric hoists which have been fairly numerous since the slackening of inquiries in electric overhead cranes have also fallen off considerably. The Pan American Dock & Terminal Co., lessees of the two docks at Staten Island, which are to be fully equipped with modern material handling facilities, expects to decide on the specifications for the cranes by the end of June. Among recent inquiries is one from the Newport News Shipbuilding Co., Newport News, Va., for a 100-ton overhead traveling crane.

Among recent sales are: The Cleveland Crane & Engineering Co., a 10-ton overhead traveling crane to the Standard Oil Co., Toledo, Ohio; the Shepard Electric Crane & Hoist Co., a 2-ton, 29-ft. 3-in. span single I-beam crane to the Otis Elevator Co., Harrison, N. J., and a 3-ton, 34-ft. 9-in. span overhead traveling crane to the Saco-Lowell Shops, Lowell, Mass.

The Habirshaw Electric Cable Co., 10 East Forty-third Street, New York, manufacturer of electrical wires, cables, etc., is planning for a one-story addition, 60 x 100 ft., to its plant at Glenwood, Yonkers, N. Y., to cost about \$30,000. The Fletcher-Thomson Co., Inc., 1088 Broad Street, Bridgeport, Conn., is engineer. The company also operates a plant at Bridgeport.

The Sectional Radiator Co., New York, has been incorporated with a capital stock of \$50,000 by H. Dobb and

S. Berman, 189 West End Avenue, to manufacture automobile radiators.

The Bape Steel Corporation, New York, has been incorporated with a capital stock of \$50,000 by H. S. and H. P. Bape and L. P. Lane, 70 East Forty-fifth Street, to manufacture iron and steel products.

Stephen Ransom, 401 West Street, New York, operating a marine repair works, has awarded a contract to Wharton-Green, Inc., 37 West Thirty-ninth Street, for a one-story machine shop, 150 x 200 ft., at 518 Hamilton Avenue, Brooklyn, to cost about \$250,000, including equipment. A one-story electric substation, 55 x 70 ft., will also be erected.

The Britton Auto Products Co., New York, has been incorporated with a capital stock of \$150,000 by V. F. and M. L. Britton and V. L. Sawyer, Hotel Empire, to manufacture automobile and airplane parts and equipment.

The S. S. Hepworth Co., 2 Rector Street, New York, manufacturer of sugar machinery, centrifugals, etc., has increased its capital stock to \$100,000.

Plans for a one-story foundry, 100 x 250 ft., to cost about \$200,000, with equipment, are being prepared by Henry Holder, Jr., architect, 242 Franklin Avenue, Brooklyn. The owner and location will be announced at an early date.

The Shann Mfg. Co., Middletown, N. Y., has been incorporated with a capital stock of \$20,000 by F. Van Amber, F. W. Morgan and G. H. Crawford, to manufacture cutlery and other metal specialties.

The Soss Mfg. Co., 776 Bergen Street, Brooklyn, manufacturer of hardware specialties, has awarded contract to William Flanagan, 118 East Twenty-eighth Street, New York, for a three-story addition, 100 x 100 ft., at Bergen Street and Grand Avenue, to cost about \$50,000.

The Yonkers Electric Light & Power Corporation, Yonkers, N. Y., will build a new two-story reinforced concrete and steel power station on Columbus Place, to cost about \$200,000.

The Republic Ash Can Co., New York, has been incorporated with a capital of \$40,000 by E. and P. Renenson, and L. Seltzer, 635 East Fifth Street, to manufacture metal cans and specialties.

The Pioneer Electric Service Corporation, Brooklyn, manufacturer of electrical specialties, has increased its capital stock from \$20,000 to \$120,000.

The Eager Electric Co., 282 West Main Street, Watertown, N. Y., manufacturer of dynamos and motors, is planning for the erection of a new foundry on Newell Street.

The Overman Cushion Tire Co., 250 West Fifty-fourth Street, New York, manufacturer of automobile tires, is arranging for an increase in its capital stock from \$550,000 to \$900,000.

The Majestic Garage Corporation, New York, has leased the five-story building at 213-17 West Eighty-fourth Street for a new service and repair works.

D. Costagliola & Co., Inc., Brooklyn, has been incorporated with a capital stock of \$500,000 by W. J. Eldredge, C. P. Schroetter and J. A. Martin, 64 Wall Street, to operate a shipbuilding and repair plant.

W. L. Newton & Co., Inc., New York, has been incorporated with a capital stock of \$75,000 by H. C. Wood, S. Sultan and W. L. Newton, 616 West 116th Street, to manufacture talking machines and parts.

The Baker Perkins Co., White Plains, N. Y., manufacturer of food machinery, has leased the Tod Building, occupying the block on Martine Avenue between Court Street and Mamaroneck Avenue, for a new local establishment.

The Packard Motor Car Co., Broadway and Sixty-first Street, New York, will take bids at once for its three-story reinforced concrete and brick service and repair building, 200 x 480 ft., on Bedford Avenue, Brooklyn, to cost about \$200,000. Albert Kahn, 1000 Marquette Building, Detroit, is the architect.

The Simmons Co., 2364 Third Avenue, New York, manufacturer of brass and iron beds, with headquarters at Kenosha, Wis., has leased the building on the south side of 137th Street, near Fifth Avenue, for a new local establishment.

The Monroe Calculating Machine Co., 49 Mitchell Street, Orange, N. J., manufacturer of adding machines, etc., is having plans prepared for a four-story addition, 65 x 200 ft., to cost about \$150,000.

Fire, June 7, destroyed an aircraft parts building of the Navy Department, Gloucester City, N. J., with loss reported at \$50,000.

The Driver-Harris Co., Harrison, N. J., manufacturer of electrical resistance wires, metal alloys, special castings, etc., has arranged for a preferred stock issue of \$750,000, making a total capitalization of \$3,000,000. The proceeds will be used for additions and new equipment. It also operates a works at Walkerville, Canada, and a plant at Manchester, England.

The Gaso-Meter Corporation, Jersey City, N. J., has been incorporated with a capital stock of \$100,000 by Frank Kent, Edward Rice and John Kollin, to manufacture special meters, parts, etc.

The White Metal Mfg. Co., 1006 Clinton Street, Hoboken, N. J., manufacturer of collapsible tubing, etc., has filed plans for a one-story, brick addition.

The Mersereau Metal Bed Co., 292 Johnston Avenue, Jersey City, N. J., manufacturer of brass and steel beds, has filed plans for an addition to cost about \$15,000.

The Seamless Rubber Co., Harrison, N. J., manufacturer of inner tubes for automobile tires, etc., has leased the building at 105 Harrison Avenue, Harrison, N. J., for a new local works.

The Perth Amboy Dry Dock Co., foot of Broad Street, Perth Amboy, N. J., will build a two-story steel and concrete addition to its machine shop, 70 x 100 ft., and will install considerable new equipment. It is completing a 70 x 90 ft. addition to its forge shop, and has arranged for immediate operations in a new boiler, plate and angle shop, 70 x 108 ft., recently completed. It also expects the delivery of a new drydock, now being constructed at Kingston, N. Y., during July, and installation work will be rushed to permit the earliest operation. Included in the equipment to be installed in connection with the drydock will be electrically operated pumping units, valves and other mechanical apparatus.

The Bureau of Yards and Docks, Washington, D. C., has completed plans for a new power plant with electric distributing system at Lakehurst, N. J., to cost about \$400,000. The installation will comprise three turbo-alternators, exciter equipment, switchboard, motors, etc.

The Grove Auto Radiator Co., 356 Grove Street, Jersey City, N. J., has filed notice of organization to manufacture automobile radiators and other metal specialties. Benjamin D. Gross heads the company.

The Middlesex Water Co., Rahway, N. J., will install new booster and pumping equipment at its local plant, with daily capacity of about 4,000,000 gal. of water.

The Standing Non-Skid Chain Co., 339 Bloomfield Avenue, Newark, N. J., has filed notice of organization to manufacture automobile chains, etc. Victor O. Hill, 42 South Walnut Street, East Orange, N. J., heads the company.

The Foster Engineering Co., 107-109 Monroe Street, Newark, manufacturer of automatic valve and steam specialties, has completed plans for a four-story addition, 63 x 100 ft., to cost about \$120,000.

A one-story power house, 40 x 80 ft., to cost about \$30,000, will be erected by M. Straus & Sons, Newark, at their leather works, 506-8 Frelinghuysen Avenue.

The United Auto Body Building Co., 199 Howard Street, Newark, has been organized to manufacture truck and other automobile bodies. Harry Solomon, 165 Prince Street, heads the company.

The M. Theis & Sons Cutlery Co., 475 Washington Street, Newark, has been incorporated with a capital stock of \$50,000 by Max Theis, Sr., and Jr., and Ernest Theis, to manufacture cutlery and other hardware specialties.

The Universal Tobacco Machine Co., 98 Murray Street, Newark, manufacturer of tobacco stripping and booking machines, has filed plans for a one-story brick machine shop, 97 x 100 ft., to cost about \$35,000.

Plans have been completed by the Schofield Oil Co., Avenue R, Newark, for a new power plant to cost about \$30,000.

The Newark Spinning & Stamping Co., 2 Commercial Street, Newark, has been organized to manufacture metal-working machinery and other equipment. Gerard M. Abbott, 17 Carteret Street, heads the company.

The Whitehouse-Le Compte Mfg. Co., 44 Elm Street, Newark, manufacturer of hardware, etc., has changed its name to the E. A. Whitehouse Mfg. Co.

The Superior Auto Radiator Works, 11 Sixteenth Avenue, Newark, has filed notice of organization to manufacture automobile radiators and other metal specialties. Michael Silverman, 493 Clinton Avenue, heads the company.

Bids have been taken by the Board of Education, Newark, for the new Seymour Vocational School, estimated to cost about \$1,125,000, exclusive of equipment. This latter will include a complete machine shop, forge shop, electrical plant and other departments.

The New Jersey Textile Machine Co., 72 Berkshire Place, Newark, has been organized to manufacture textile machinery and parts. Lewis Friedenberg, 24 Park Place, Irvington, N. J., heads the company.

The Jennings Silver Co., 390 Nye Avenue, Irvington, N. J., manufacturer of silver-plated ware, metal goods, etc., has increased its capital stock from \$25,000 to \$250,000.

The Hellman Motor Corporation, Long Island City, N. Y., has completed plans for new works at Ely and Sunswick avenues, to cost about \$75,000. McEvoy & Smith, Queens Plaza Court, Long Island City, are the architects.

Philadelphia

PHILADELPHIA, June 14.

The Eastern Foundry & Machine Co., Liberty Building, Philadelphia, has awarded a contract to Charles Davis & Sons, Fifteenth and Ellsworth streets, for a new one-story plant, 60 x 120 ft., at Fernwood, to cost about \$25,000.

The General Electric Co., Schenectady, N. Y., has acquired about 20 acres on Elmwood Avenue, between Sixty-eighth and Seventieth streets, Philadelphia, for a consideration said to be \$275,000, as a site for the erection of a new plant. No official announcement has as yet been made, but it is reported that the company will break ground early in the fall for the new works, which are estimated to cost in excess of \$5,000,000, including machinery.

The Enterprise Mfg. Co., Third and Dauphin streets, Philadelphia, will build a new boiler and engine plant at its hardware specialty manufacturing works at Bodine and Susquehanna streets, to cost about \$28,000.

The Belmont Packing & Rubber Co., 133 North Second Street, Philadelphia, has awarded a contract to the Hogg Construction Co., Denckla Building, for a new two-story plant, 120 x 120 ft., to cost about \$100,000, including equipment.

The Biddle Motor Car Co., Inc., 1210 Frankford Street, Philadelphia, manufacturer of automobiles, has arranged for a stock issue of about \$376,000. The proceeds will be used for extensions and equipment in its plant at 1 West 142nd Street, New York. It is planned to install a body manufacturing department. S. N. Bourne is president.

The addition to be erected at the plant of the Hess-Bright Mfg. Co., Front and Erie streets, Philadelphia, manufacturer of ball bearings, etc., is estimated to cost about \$51,000, including equipment, and will be used as a forge and billet shop. Plans have been filed.

The Philadelphia Electric Co., Chestnut Street, Philadelphia, has filed plans for a new power house on North Sixth Street, to cost about 137,500. Fire, June 3, destroyed its building on Thirty-second Street, with loss, including equipment and stock, estimated at \$200,000.

The Hale & Kilburn Corporation, Eighteenth and Lehigh streets, Philadelphia, manufacturer of iron and steel specialties, will make improvements and extensions in its power plant to cost about \$60,000. New boilers, stokers and auxiliary equipment will be installed. Plans are being prepared.

The Hurley Motor Co., Broad and Race streets, Philadelphia, has acquired 58 x 108 ft., in the vicinity of its present building, for a consideration said to be about \$500,000, and contemplates the erection of a new fifteen-story structure. Plans for the building are being prepared.

The Universal Compound Co., Camden, N. J., has been incorporated with a capital of \$200,000 by E. V. Abbott, G. Tinsley Herzog and George Furnell, to manufacture foundry equipment and supplies.

The Bethlehem Shipbuilding Corporation, Bethlehem, Pa., has increased its capital stock from \$15,500,000 to \$25,000,000.

The Graff Furnace Co., 2240 Jackson Street, Scranton, Pa., manufacturer of stoves, heaters and ranges, has had plans prepared for a two-story addition, 60 x 120 ft., to cost about \$30,000.

The Bethlehem Motors Corporation, Allentown, Pa., manufacturer of motor trucks, has arranged an expansion program aggregating about \$1,300,000 for extensions. The work will include structures now under way, new buildings, and equipment installation.

The Sun Shipbuilding Co., Chester, Pa., is perfecting plans for an expansion program to cost about \$3,000,000, including new shipways, shop buildings and machinery, as well as a floating drydock. It is giving employment to about 7000, and is said to have sufficient work on hand to require this force for at least 24 months to come. John G. Pew is president.

The York Haven Paper Co., York Haven, Pa., is planning for the installation of new electric machinery and other equipment at its plant. A building now in course of erection will be ready for occupancy in July.

The business of the estate of John Nazel, deceased, has been succeeded by the Nazel Engineering & Machine Works, Philadelphia, with the following officers: Ralph W. Nazel, president and general manager; C. H. Wackernagel, vice-president and assistant manager; J. Milton Nazel, secretary and treasurer. This change will not affect the business policy of the founder, John Nazel, since its establishment in 1900, the managing personnel being practically the same as it has been the past 15 years.

New England

BOSTON, June 14.

Many machine-tool dealers report the market almost flat the past week. Various reasons are advanced in explanations, including the belief that prices in general have reached the peak, and the disposition among buyers to do more shopping than has been the case heretofore. The money situation has been the greatest restraining influence, however. Many leading companies are finding it expensive and difficult to keep assets in liquid form and are curtailing purchases of equipment and materials.

The Providence Engineering Co., Providence, R. I., has not closed on its new list. An automobile interest has guaranteed the company a certain amount of crankshaft work provided it can be turned out quickly, but if it is unable to get prompt shipments on necessary tools the list may be abandoned. It is anticipated the Amoskeag Mfg. Co., Boston, will close on at least a part of its list before the end of another week. Lathes are needed more than anything else. The Mead-Morrison Mfg. Co., East Boston, lifting machinery, has bought and is still buying against its list and the Saco-Lowell Works, Boston, textile machinery, continues to take single tools for its new Maine plant. The Taft, Peirce Mfg. Co., Woonsocket, R. I., special machinery, is purchasing a tool now and then for the production of automobile parts. The General Fire Extinguisher Co., Providence, R. I., has placed orders for several special design tools and has under consideration the purchase of several lathes on which quick deliveries are wanted. The Boston Gear Works, Norfolk Downs, Quincy, Mass., bought two additional thread millers, and a Hudson, Mass., concern a large milling machine. J. J. Hinds, Pawtucket, R. I., is buying New Britain automatics, Norton grinders and other equipment for the production of automobile parts.

While domestic orders for machine tools are decreasing, those for export appear satisfactory. England is taking considerable equipment, as well as France, Norway, Sweden, Spain and Portugal. Buying for Italy, however, is restricted because of the demoralized condition of the rate of exchange on that country. Europe, according to common belief, has not begun to buy the tools needed. One Connecticut builder of lathes last month sold 27 to British consumers, and expects to close on as many or more this month for French account. Another Connecticut manufacturer reports an excellent export demand for vertical millers, spline and drilling machines and grinders.

The Amoskeag Mfg. Co., Boston, has closed for a 60-ton

crane. There is some call for hand cranes and hoists, but otherwise the market is lifeless.

Prices show no weakening. One make of pipe threading and cutting off machines has advanced 10 per cent the past few days and some Connecticut manufacturers of chucks are considering raising their prices. Large chucks are so expensive to make that the margin of profit is very small or eliminated, and because of this higher prices are contemplated.

The Maine Central Railroad Co., Portland, Me., has awarded contract for an addition to its car repair shop at Waterville, Me.

The Starin Mfg. Co., Springfield, has been granted a Massachusetts charter to do a general machine shop and foundry business and to manufacture casket hardware and other metal products. It is capitalized for \$50,000, divided into 2500 shares of common stock, par \$10, and 2500 preferred, par \$10, all of which is issued. Frank Starin, 304 North Main Street, is president and treasurer. Michael A. Dunn, Framingham, and Miles E. Purcell, Springfield, are directors.

Thomas F. Brown, 137 Brook Street, Brighton, Boston, president, and Russell C. Harrington, 157 Glenway Street, Dorchester, Boston, treasurer, have incorporated under Massachusetts laws the Colonial Brass & Bronze Co., Middleboro, with a capital of \$125,000, divided into 1000 shares of common stock, par \$100, and 250 preferred, par \$100, all of which is issued. The company will make bronze memorial tablets, letters, fireplace accessories, cast machinery name plates, etc.

The Martin-Wasp Corporation, Bennington, Vt., organized in June, 1919, and the only motor car plant in that State, is now turning out a standard chassis. Production, however, will be limited this year owing to the scarcity of efficient labor and materials. Plans for increased production have been made for 1921. The company does its own machine work, together with iron and brass work in its foundry. It also produces coach lamps and custom built bodies. Karl H. Martin, president, for the past 12 years has been identified with the New York and Chicago automobile custom coach-work trade. Robert E. Healy is vice-president, and Richards Kellogg, treasurer.

The Northway Motors Corporation, Natick, Mass., automobile trucks, contemplates the erection of a forge shop some time this year for the manufacture of shafts.

The Cushman Chuck Co., Hartford, Conn., has materially increased its production the past few months. About 40 per cent of its output is exported.

The National Co., Oliver Street, Boston, scientific toys and engineering specialties, whose plant was recently burned, is temporarily located at 338 Congress Street. It is erecting a new factory at Cambridge, Mass., and is in the market for light production equipment.

The G. L. Holt Co., Hartford, Conn., shelf hardware and automobile accessories, formerly at 550 Asylum Street, is now occupying three floors, at 16 Sigourney Street. It is working on an order for 250,000 screw drivers placed by an automobile accessories company and last week received another order for 100,000. H. Bissell Cary is president and J. L. Richardson, secretary and treasurer.

Work on the one-story, 60 x 120-ft. addition to the plant of the Spencer Turbine Co., Hartford, Conn., is well underway.

The plant of the Thinsheets Metal Co., Railroad Hill, Waterbury, Conn., is to be enlarged.

Contract has been awarded by the Buckley Foundry Co., Springfield, Mass., for a one-story concrete block foundry, 40 x 85 x 125 ft., on Roseland Street.

Contract has been let for a one-story, 75 x 100-ft. foundry for the United States Electric Co., New London, at Fort Trumbull, Conn., for the manufacture of an electric riveter and heater that will heat a rivet and drive it into steel at one operation. Several buildings on the site will also be remodeled.

The Reed & Prince Mfg. Co., Worcester, Mass., manufacturer of screw and screw machine products, will make extensions to its plant, consisting of a four-story administration building, 106 x 182 ft.; three-story factory, 63 x 118 ft., with ell 30 x 64 ft., and a one-story recreation hall, 59 x 108 ft.

The Milford Tool & Engineering Co., Milford, Conn., has filed notice of dissolution.

The Bausch Machine Tool Co., Wason Avenue, Bridgeport, Conn., has taken bids for a two-story addition, 60 x 130 ft., to cost about \$50,000. McClintock & Craig, 33 Lyman Street, are architects and engineers.

The United Electric Co., Springfield, Mass., has completed plans for an addition to its power plant on Carew Street, to cost about \$100,000.

The Westport Brass Foundry Co., Westport, Conn., has been incorporated with a capital stock of \$25,000 by W. A. Seide and H. R. Sherwood, Westport, and C. D. Craig, Bridgeport, to manufacture brass and bronze castings, etc.

The Bridgeport Machine Co., Beardsley Street, Bridgeport, Conn., has completed plans for the erection of a one-story addition, 40 x 80 ft., to cost about \$17,000.

The Bryant Electric Co., Bridgeport, Conn., manufacturer of electrical switches, etc., has filed plans for a four-story addition, 60 x 159 ft., on Organ Street, estimated to cost about \$140,000, and a building on State Street, four stories and basement, 60 x 128 ft., to cost about \$60,000.

The Spafford Machine Screw Works, Inc., Hartford, Conn., has been incorporated with a capital of \$330,000 by F. L. Spafford, 516 Asylum Street; C. W. Cramer and C. B. Stevens, to manufacture machine screw products and other specialties.

The Miller Metal Work Co., Southington, Conn., has filed notice of dissolution.

The Vermont Marble Co., West Rutland, Vt., has completed arrangements for a new two-story plant, 100 x 330 ft., to cost in excess of \$200,000, including machinery.

Fire June 2 destroyed a building at the plant of the Panther Rubber Mfg. Co., Stoughton, Mass., with loss reported at \$150,000.

Baltimore

BALTIMORE, June 14.

The Maryland Western Railway Co., Baltimore, has been granted permission for the construction of its new coal pier at Port Covington, 70 x 780 ft., which will be equipped for a capacity of 1,000,000 tons of coal a year. The installation will include loading and unloading machinery, cranes, etc., to be located in such a way as to eliminate the necessity of a system of conveyors. The McLean Contracting Co., Fidelity Building, has the building contract.

The Baltimore & Ohio Railroad Co., Baltimore, will erect a one-story concrete and steel car shop, 28 x 140 ft., with extension 12 x 42 ft., at Pratt and Poppleton streets, to cost about \$100,000, including equipment.

P. D. Gibson, 2401 Eastern Avenue, Baltimore, has leased space in the Varsity Building and will establish a plant for the manufacture of sheet metal and tin plate dish-washing machinery. The initial equipment will be for the production of hand-power machines and is estimated to cost about \$35,000. Later, additional machinery will be acquired for the manufacture of electrically operated machines. It is planned to develop a daily output of about 400 machines.

The City Council, Bedford, Va., is having plans prepared for the enlargement of its hydroelectric power plant, including the installation of new generating units. W. C. Whitney & Co., Virginia Railway & Power Building, Richmond, are the engineers.

The Virginia-Carolina Rubber Co., Richmond, Va., recently incorporated with a capital stock of \$200,000, has established headquarters in the Real Estate Exchange Building and is having plans prepared for a brick and steel plant, 50 x 240 ft., for the manufacture of automobile tires. Charles L. Shackelford is secretary.

A. P. Vane of Vane Brothers, operating a ship chandlery plant at 602 East Pratt Street, Baltimore, has taken formal possession of the shipbuilding plant of the Delaware Shipbuilding Co., Seaford, Del., recently acquired, which will be operated under the name of the Seaford Marine Railway Co. Plans for extensive activities are under way, including new construction and repair work. Charles R. Marvel will be superintendent of construction.

The Columbia Railway, Gas & Electric Co., Columbia, S. C., is planning for an addition to its local power plant, to cost about \$400,000, including equipment.

The Atlantic Welding Works, Charleston, S. C., has been organized to manufacture welding equipment. A. H. Douglas and A. W. Todd head the company.

The Remschell Auto Sales Co., 121 North Fairfax Street, Alexandria, Va., has had plans prepared for a service building and repair works at King and Peyton streets, to cost about \$60,000.

The Chesterfield Mfg. Co., Kinston, N. C., is considering plans for a new power plant at its cotton mill on Swift Creek, Petersburg, Va.

The Harloe Tire Co., Winchester, Va., recently incorporated with a capital stock of \$500,000 to manufacture automobile tires, is having plans prepared for its new plant to cost about \$150,000. Morton Harloe is president and Wilmer Shryock treasurer.

The Maryland Motors Corporation, Munsey Building, Baltimore, is having plans prepared for a two-story plant, 30 x 50 ft., at Laurel, Md., for general works service, estimated to cost about \$100,000 with equipment.

P. D. Gibson, 2401 Eastern Avenue, Baltimore, will install equipment for the manufacture of dish-washing machinery.

A one-story addition is being planned by the Pangborn Corporation, Hagerstown, Md.

With \$25,000 capital stock, the F. N. Hayes Machine & Motor Co., Roanoke, Va., has been incorporated to engage in repair work, etc. C. E. Cassidy is secretary.

Quotations on high-speed drills are wanted by J. O. Justice, Portsmouth, Va.

The Ward-Squires Co., Carrboro, N. C., has been incorporated with \$25,000 capital stock, by R. H. and N. Ward and J. T. Squires, to manufacture harvesting machines.

Buffalo

BUFFALO, June 14.

The Electro-Metallurgical Co., Union Street, Niagara Falls, N. Y., has completed plans for a one-story building to cost about \$10,000.

The Lake Shipbuilding Co., Buffalo, has been merged with the Buffalo Marine Construction Corporation under the latter name.

The Riverside Machine Co., Buffalo, has been incorporated with a capital stock of \$20,000 by W. A. and G. W. Gibson and W. J. Wilson to manufacture machinery and tools.

The Buffalo General Electric Co., Electric Building, Buffalo, has completed plans for an addition to its power plant at Babcock and Hannah streets, to cost about \$20,000.

The new foundry of Josiah Anstice & Co., Rochester, N. Y., at Humboldt Street and Culver Road, will be used for the production of iron castings. It will be one-story, 145 x 216 ft. A cupola will be located approximately at the center of one of the long sides.

The Dukesmith Air Brake Corporation, Buffalo, has changed its name to the Reliance Air Brake Corporation.

The Force-Draft Grate Corporation, Rochester, N. Y., has been incorporated with a capital stock of \$20,000 by E. W. Shipley, C. W. Meyer and D. F. Laidlaw, to manufacture grates, boiler specialties, etc.

The Harvey Wheel & Rim Co., Buffalo, has disposed of its plant at 163-5 Adams Street, comprising a three-story factory, 60 x 105 ft., to J. H. Cummings, head of Carter, Cummings & Co., Toronto, manufacturer of chemical products.

The Owego Foundry Co., Owego, N. Y., is considering the erection of a two-story addition, 50 x 100 ft.

The Jamestown Malleable Products Corporation, Jamestown, N. Y., has been incorporated with a capital stock of \$500,000 by F. C. Anderson, C. A. Lenna and W. J. Lausterer, to manufacture iron, steel and other products.

The new two-story machine shop, now in course of erection by the Sowers Mfg. Co., 1300 Niagara Street, Buffalo, manufacturer of automobile castings and machinery, will provide facilities for about 80 men. It will be of reinforced concrete, 60 x 72 ft., serving as an addition to an existing machine shop.

The Canandaigua Motor Parts Mfg. Co., Canandaigua, N. Y., has been incorporated with a capital stock of \$10,500 by A. W. and C. H. White, and C. O. Hallenbeck, to manufacture automobile parts and other iron and steel specialties.

The Erie Foundry Co., Twelfth Street, Erie, Pa., has completed plans for a two-story and basement building, 40 x 70 ft., to cost about \$50,000.

The G. H. Williams Co., 600 Haybarger Lane, Erie, Pa., manufacturer of buckets, derricks, etc., will soon commence work on the superstructure for the new two-story shop addition, 64 x 82 ft., to cost about \$40,000.

Cleveland

CLEVELAND, June 14.

The machine-tool market looks brighter than during the previous two weeks. While the demand is slightly better, it is confined almost entirely to single machines, as many prospective purchasers of round lots are still holding back. With the exception of the equipment needed for a few new plants and extensions under construction, the demand is almost wholly for machines for quick delivery. Considerable factory work in Cleveland is either being delayed or has been entirely suspended because of the inability to secure

building material, a shortage in which was caused by the railroad strike. The largest inquiry out is from the Cleveland Hardware Co. for 20 single-spindle drilling machines. Some machinery has been canceled by two Detroit manufacturers of automobile parts, but with these exceptions there have been very few cancellations. Deliveries are improved in most lines.

Second-hand machinery is in fair demand and is being placed on the market. The Biggs-Waterson Co., Cleveland, has arranged to handle the sale of about 300 new and used machines owned by the Packard Motor Car Co., Detroit, and a Cleveland and Toledo dealer have taken over used machinery from the Elyria, Ohio, plant of the Willys-Overland Co.

Makers of industrial locomotives and cars report a very good demand for their products from the steel plants, activity in this line having increased within the last week or two.

Cleveland machinery houses are receiving inquiries from the American Motorcycle Co., with temporary offices at 35½ North High Street, Columbus, Ohio, for about 25 machine tools, including tapping, drilling, milling, grinding, screw machines, shears, etc. The company has been incorporated with a capital stock of \$200,000 and is building a plant in Louisville, Ky., which it will occupy July 1.

The Van Sicklin Speedometer Co., Toledo, is inquiring in the Cleveland market for a four-spindle drilling machine and the Champion Engine & Supply Co., 21 Park Row, New York, is inquiring for a vertical boring turning machine.

The H. K. Ferguson Co., Cleveland, recently took contract for a one-story brick and steel factory, 100 x 262 ft., for the Cyclone Starter & Truck Co., Greenville, S. C., at an estimated cost of \$125,000; a one-story brick and steel building, 60 x 222 ft., for the Frost Superior Fence Co., Warren, Ohio, which will move its plant to that city from Cleveland, and a building, 60 x 160 ft., and boiler house for S. C. Johnson & Co., Racine, Wis., to be erected at Brantford, Ont., as a Canadian branch.

The Columbian Axle Co., Cleveland, has purchased the power factory building of the Seventy-second Street Properties Co., and considerable adjoining real estate with a view of providing room for future expansion. The structure acquired is now occupied by several manufacturing companies. The axle company is not planning any machinery purchases in the near future.

The Automobile Machinery Co., Cleveland, composed of interests connected with the Chandler and Cleveland Automobile companies, has been recently organized and is erecting a plant near the Cleveland Automobile Co.'s plant for the manufacture of automobile parts. It has purchased some new equipment and it is expected to buy additional machinery.

The Osgood Co., Marion, Ohio, manufacturer of excavating machinery, has recently made a 200-ft. addition to its main machine shop, and has also just completed a new iron foundry and pattern storage house. Machinery and other equipment have been purchased and are now being installed.

The Commercial Steel Casting Co., Marion, Ohio, has completed an addition to its foundry providing 15,000 sq. ft. of additional floor space. The building was erected by the Bellefontaine Bridge & Steel Co., Bellefontaine, Ohio, and all machinery and other equipment have been purchased. Its open-hearth steel casting capacity has been increased about 20 per cent.

The Elyria Steel Products Co., Elyria, Ohio, manufacturer of steel underframes for automobiles and trucks, has increased its capital stock from \$150,000 to \$300,000. Its main building was enlarged from the original plan, and a power house is being added. The increase in capital was to provide funds for these extensions. All equipment has been purchased through the Progress Machine Works, Chicago, and Strong, Carlisle & Hammond, Cleveland, and it is not in the market for any additional machinery.

The Universal Tool & Machine Co., 601 Mahoning Road, Canton, Ohio, has been incorporated with a capital stock of \$200,000 and will make extensions to its plant. J. E. Lehman, who has been proprietor of the business, will be president.

The McClellan File Co., Cleveland, has placed contract for the erection of a one-story factory, 62 x 120 ft.

The Chain Products Co., Cleveland, has increased its capital stock from \$250,000 to \$450,000.

It is reported that the F. R. Faegel Motors Co., Oakland, Cal., is planning to equip a branch factory in Cleveland.

The Spencer Metal Products Co., Spencer, Ohio, plans a one-story addition, 40 x 180 ft.

The Kenton Hardware Co., Kenton, Ohio, has placed a contract for the erection of a factory, 60 x 190 ft.

The Houghton Malleable Castings Co., Spitzer Building,

Toledo, Ohio, is taking bids for the erection of a new plant on Bassett Street, near Michigan Street, consisting of three buildings. A large part of the works will be devoted to foundry operations, and is estimated to cost about \$500,000, including equipment. I. Houghton is president.

The Halladay Motor Corporation, Newark, Ohio, is planning to inaugurate construction during the summer on a one-story plant, 80 x 400 ft. E. N. Mastle is manager.

The Pittsburgh Crane & Equipment Co., Sharpsburg, Pa., has received an order from the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, for four 6-ton spout hoist jib cranes with motor-driven hoist.

Milwaukee

MILWAUKEE, June 14.

Inquiry from and buying by the automotive industries shows a marked lessening in the last week or two, but other divisions of the metal-working trades are placing a fair amount of business. Many shops are steadily in the market for single tools or small lots for replacements and to piece out equipment. Milling machine makers especially are favored in this direction.

It is significant that local architects and engineers are as busy as they have been for a year or longer, although much of the work in hand is in the nature of sketches and estimates of proposed shop buildings and extensions, the determination of which awaits figures on costs and definite dates of completion. Structural shops, which generally are filled with work until late summer, are estimating numerous jobs of this character, but as a rule do not appear anxious to accept new business for the time being.

The electric crane business is active, requirements placed and pending aggregating a relatively large volume.

The Heil Co., Milwaukee, manufacturer of hydraulic hoist equipment and riveted and welded steel tanks and dump bodies for motor trucks, is letting contracts this week for a brick and steel shop, 125 x 250 ft., at Twenty-sixth and Montana avenues, estimated to cost about \$120,000 with equipment, including one 10-ton and one 5-ton electric traveling crane. The extension will be used mainly as a receiving shop and initial processes in fabricating material will be done here to feed the existing shops, which are laid out for a continuous progress of work. The architect is Frank Howend, 69 Wisconsin Street, and the engineers are Klug & Smith, Mack Block. Julius P. Heil is president and general manager.

The John Obenberger Forge Co., Milwaukee, is taking bids for an addition to the forge shop and an additional steel storage building at its works, Fifty-third and Burnham streets, which will cost about \$100,000. Practically all of the new hammer and furnace equipment has been placed. The Obenberger company recently increased its authorized capital stock from \$250,000 to \$500,000 to finance this improvement and other extensions erected during the last six months. John Obenberger is president and general manager.

The American Metal Products Co., 671 Kinnickinnic Avenue, Milwaukee, manufacturer of bronze and aluminum castings, has plans for a foundry, 50 x 75 ft., and a machine shop, 75 x 150 ft., to be erected on a new site at Fifty-third Avenue, near Burnham Street. The present plant will be disposed of when the new works are ready. The company has increased its capital stock from \$100,000 to \$300,000 to finance the new construction and equipment. George F. Staal, city engineer, Milwaukee, is president of the corporation and in charge of the design and construction work. C. J. Zaiser is secretary-treasurer.

The Milwaukee Board of Industrial Education, 62 Mason Street, Milwaukee, is asking bids until 5 p.m., June 21, for a miscellaneous list of lathes, grinders and tools for the equipment of the new \$1,000,000 Central Continuation School at Seventh and Prairie streets. The bulk of the machine tool requirement has been purchased from the surplus stocks of the War Department and the prospective purchases are for piecing out the equipment. R. L. Cooley is principal.

The Brady Brass Works, 243 Lake Street, Milwaukee, sustained a heavy loss on building and equipment by fire on June 4. Repairs and replacements are now being made.

The West Bend Aluminum Co., West Bend, Wis., has broken ground for three-story brick, concrete and steel sash addition, 168 x 192 ft., costing about \$75,000 without equipment, and also has plans for a second addition to be erected later in the year. It manufactures kitchen utensils, novelties and other stamped and drawn ware. The size of the plant was doubled a year ago.

The Sturgeon Bay Dry Dock Co., Sturgeon Bay, Wis., has been incorporated with a capital stock of \$300,000 to

engage in the general marine engineering, equipment and repair business and is taking over some of the buildings and machinery of the Universal Shipbuilding Co. at Sturgeon Bay. H. L. Peterson is president of the new corporation.

The Wagner Electric Mfg. Co., St. Louis, has leased floor space at 501 Broadway, Milwaukee, and is establishing a general service station, in charge of S. B. Moyer. It has maintained a sales office in the First Wisconsin National Bank Building, under the management of F. T. Coup, for several years. This will be continued.

The Pillar Products Co., Milwaukee, a new \$25,000 corporation, has opened a machine shop at 182-184 Lincoln Avenue and will specialize in automatic screw machine products for the automotive industries. The initial equipment will be increased gradually, pending the erection of a new shop, probably before the end of this year. George B. Pillar is president and treasurer.

The University of Wisconsin, Madison, has let the general contract to L. B. Gilbert, local contractor, for a one-story brick and concrete shop building, 108 x 182, for the college of engineering. The bulk of the tool and other equipment is being purchased from the surplus stocks of the War Department. H. J. Thorkelson is business manager of the university.

The Automotive Repair Co., 1517 Concordia Avenue, Milwaukee, has been organized by William Hester and Robert Keller, to do general machine and repair work. Present equipment needs have been filled.

The Murray-Mylrea Co., Antigo, Wis., founder and machinist, has taken a contract from the Allis-Chalmers Mfg. Co., Milwaukee, for the production of tractor castings, which will require the normal output of the foundry from eight to ten months. A new turret lathe is being installed and further enlargement of the equipment is planned.

The Petit Mfg. Co., Milwaukee, has been organized with a capital stock of \$100,000 to manufacture special metal-working machinery. Contracts were let the past week for a one-story brick and concrete machine shop, 60 x 120 ft., at 1510-1516 Buffum Street, costing \$30,000 without equipment. Most of the machinery has been provided for. Douglas W. Petit is secretary and general manager.

The Board of Education, Fond du Lac, Wis., has commissioned Childs & Smith, architects, Chicago, to prepare detailed plans for the new \$1,000,000 high school and vocational training institute. Bids will be taken early in July.

The Prime Mfg. Co., 97 Wisconsin Street, Milwaukee, manufacturer of special railroad supplies, brass castings, etc., has increased its capital stock from \$75,000 to \$150,000. The foundry and machine shop at 653 Clinton Street is being enlarged and further extensions are planned in the building and equipment. Orton L. Prime is president.

The Longdin-Brugger Co., Fond du Lac, Wis., will engage in the manufacture of complete, all-metal bodies for automobiles, in addition to auxiliary bodies for passenger cars and a commercial car body for Fords. It has taken occupancy of its new factory, 120 ft. sq., two stories and part basement, representing an investment of more than \$100,000, including new sheet metal, wood-working, enameling and similar machinery. The capital recently has been increased from \$120,000 to \$240,000.

The Mechanical Appliance Co., 133 Stewart Street, Milwaukee, manufacturer of electric motors, electric controlling devices, etc., has increased its capital stock from \$350,000 to \$750,000, divided into 2000 shares of preferred and 5000 shares of common of \$100 par value each. The main works will be enlarged, in addition to which the company is operating a branch factory at 108 Howell Avenue. Frank W. Magin is secretary and treasurer.

Morris Brothers, Racine, Wis., brass and bronze founders, have completed the equipment of a new casting shop at Fond du Lac, Wis., in which aluminum also will be melted. The Racine plant will be kept in operation for some time longer, but the offices have been moved to Fond du Lac. Oscar and Newton Morris are the proprietors and managers.

The Turner Mfg. Co., Port Washington, Wis., has broken ground for a \$50,000 gray and malleable iron foundry addition, upon the completion of which the machine shop and assembling floor will be enlarged. It manufactures tractors, gas engines, farm implements and is a large producer of chair and furniture hardware. The project is in charge of Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago.

The Ajax Forge Co., Chicago, which established a branch works at Superior, Wis., in the spring of 1917, is erecting a brick and steel wing addition, 42 x 200 ft., to be equipped for making railroad frogs, switches, crossovers, etc., as well as renewing old material. The present force of 65

will be increased to 100 when the shop is ready about Aug. 15.

The Improved Trolley Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture machinery and devices for railroads and transportation systems. The incorporators are W. J. McElroy, attorney; H. Schweikert and J. H. Cunningham, 209 Grand Avenue.

The American Rule & Block Co., Menominee, Mich., has taken over the main building of the Menominee River Brewing Co. and will convert it into a factory for manufacturing metal and wood metering specialties. It is being recapitalized at \$100,000. Frank A. Redner is general manager.

Pittsburgh

PITTSBURGH, June 14.

The Miller Saw Trimmer Co., Point Building, Pittsburgh, manufacturer of saws, etc., has acquired the plant of the National Gear Wheel Co., South Avenue and Walker Street, Northside, with site aggregating 19,000 sq. ft., for a consideration of about \$110,000. The new owner will use the works for general expansion, and is planning for extensive casting production.

The Pittsburgh Model Engine Co., Lexington Avenue and McPherson Boulevard, Pittsburgh, has filed plans for a one-story brick addition.

The Flocker Motor Co., Union Arcade, Pittsburgh, is having plans prepared for a new two-story service and repair building, 75 x 100 ft., at Cypress and Aspen streets.

The Pennsy Watch Co., Pittsburgh, has leased property at Webster and Sixth avenues for an initial plant to manufacture a moderate-priced watch. A large part of the structure will be given over to an assembling department. Arrangements have been made with the American Instrument Works, Lacock Street, Northside, for the production of dies and tools for the new line of manufacture, and watch parts will be produced for the present at this plant. Later, the Pennsy company proposes to erect its own factory. B. E. Platt is secretary and A. Friedman, manager of production.

The McIntyre Motor Co., Pittsburgh, associated with the Standard Motor Co., Baum Boulevard, has awarded miscellaneous contracts for the erection of a three-story service and repair building, 92 x 100 ft., at Butler, Pa., to cost about \$125,000. J. E. Lowe is manager.

The McKenna Brass & Mfg. Co., First Avenue and Ross Street, Pittsburgh, has acquired the business of the J. F. Haller Co., Corliss Station, Pittsburgh, manufacturer of automatic bottling machinery, fruit washers, etc. The new owner will continue the business as a subsidiary interest to its general activities.

The Dorsey-Springer Co., Wilkinsburg, Pa., has been incorporated in Delaware with capital stock of \$25,000 by D. J. Dorsey and William Hess, Wilkinsburg, and A. W. Springer, Pittsburgh, to manufacture automobile parts and equipment.

The Pittsburgh & West Virginia Railroad Co., Wabash Building, Pittsburgh, has completed plans for a one-story forge shop, 35 x 60 ft., at Rock, Pa., to cost about \$10,000.

The Kanawha Mfg. Co., Charleston, W. Va., manufacturer of mining equipment, is planning for the erection of two one-story additions on Thompson Street, 50 x 96 ft., and 40 x 48 ft. The latter will be equipped as a forge shop.

The Central Glass Co., Wheeling, W. Va., is planning for the erection of a gas-producer plant at its works. It has increased its capital from \$300,000 to \$500,000. H. Hazlett is president.

The Hopkins Motor Car Co., Wheeling, W. Va., has acquired property at Fifteenth and Eoff streets, and plans the erection of a new four-story service building and repair works.

The Fletcher Enamel Co., Dunbar, W. Va., has perfected plans for a new one-story plant, 96 x 175 ft. It recently increased its capital stock to \$450,000.

The Wheeling Cement Products & Building Co., 622 Wheeling Bank and Trust Co. Building, Wheeling, W. Va., manufacturer of reinforced-concrete specialties, cement tile, etc., will soon commence the construction of a new plant at Warwood, near Wheeling.

The Charles Phillips Tool Co., Mannington, W. Va., manufacturer of drilling and fishing tools, is erecting a new forge shop of brick and steel, 72 x 86 ft. It will be equipped with five steam hammers and will be devoted to the manufacture of oil-well equipment. All machinery has been purchased with the exception of one steam hammer, for which the company is in the market.

Detroit

DETROIT, June 14.

Dullness continues in the local machine-tool market, the demand being limited to replacement and routine requirements.

The Signal Motor Truck Co., Detroit, is considering the establishment of a branch factory in Monroe, Mich.

Adolph A. Geisel, who since 1912 has been Eastern district manager for the Federal Motor Truck Co., Detroit, has organized a company to manufacture trucks at Springfield, Mass. A factory is in course of construction and will be completed July 1.

The Dort Motor Car Co., Flint, Mich., has reincorporated under the laws of Delaware. The capital now consists of \$3,000,000 of class A preferred stock, \$4,000,000 of class B preferred and 400,000 shares of no par value common stock.

Stockholders of the Napoleon Motors Co., of Traverse City, Mich., have approved of the increase in capitalization from \$500,000 to \$2,500,000. Of the additional shares, one-half will be preferred and one-half common.

The Simplicity Mfg. Co., Grand Rapids, Mich., reincorporated with a capitalization of \$200,000, will henceforth be known as the Simplicity Products Mfg. Co. Demountable motor wheels will be manufactured.

The Chatfield Machine & Foundry Co., Escanaba, Mich., is postponing for the present its plans for doubling the size of its plant.

By order of the court, the plant and business of the Sattley Coin Handling Machine Co., Detroit, will be offered for sale at public auction by the Detroit Trust Co., receiver. In addition to machinery for making coin-handling machines and coin wrappers, the company, which has been a going concern for 13 years, has a well-equipped machine shop and a large assortment of tools. The plant will be open for inspection after June 21.

A. W. and E. C. Filstrup, who control the Covel Mfg. Co., Benton Harbor, Mich., have purchased the business and property of the Engberg Electrical Co., St. Joseph, Mich., which employs 100 men in the manufacture of steam engines and dynamos.

The new building under construction for the Triangle Truck Co., of St. Johns, Mich., is nearly completed and installation of machinery will begin soon. The addition will enable the company to treble its production.

Construction of buildings on a 62-acre site in Grand Rapids, Mich., by the General Motors Corporation will begin soon. Two units for the manufacture of iceless refrigerators will be erected.

The Frost Gear & Forge Co., Horton and Tyson streets, Jackson, Mich., has awarded a contract to the Austin Co., Chicago, for two one-story additions, 50 x 160 ft., and 40 x 100 ft., to cost about \$80,000.

The International Metal Stamping Co., Muster and Artillery avenues, Detroit, is taking bids for a three-story addition, 78 x 530 ft.

The Aero Cushion Inner Tire & Rubber Co., Ford Building, Detroit, has awarded contract to E. F. Patterson, Ford Building, for a two-story reinforced-concrete plant, 80 x 200 ft., at Sarnia, Mich., to cost about \$75,000.

The Board of Water Commissioners, Detroit, has completed plans for a new one-story machine shop, 90 x 120 ft., on Glendale Avenue.

The Transport Truck Corporation, Mount Pleasant, Mich., contemplates the erection of a new one-story plant, 80 x 200 ft., to cost about \$100,000, including equipment.

The Wildman Rubber Co., 817 Book Building, Detroit, is planning for the immediate erection of the first unit of its new tire plant at Bay City, Mich., estimated to cost about \$1,000,000, including equipment. Two additional units will be erected later, bringing the total cost in excess of \$2,100,000. The company has a 60-acre site along the Saginaw River. The Osborne Engineering Co., Cleveland, is engineer. W. W. Wildman is president.

Chicago

CHICAGO, June 14.

The market has been without feature the past week, the situation regarding business and railroad service being practically unchanged. Shipments from Cincinnati builders have shown little improvement. Store trade is fair, but on the whole the market is slow, most current sales being restricted to one or two machines. The most important inquiry before the trade is that of the Rock Island Railroad which, it is said, will be closed within the next fortnight. That automobile manufacturers are making strenuous efforts

to overcome the handicap of curtailed deliveries resulting from the transportation strike is indicated by the report that the Nash Motors Co., Kenosha and Milwaukee, has bought two Great Lakes vessels to expedite the movement of fuel, materials and equipment from the East. Prices remain on approximately the same level, although two more advances are noted, one of 15 per cent by a manufacturer of hand screw machines and another of 10 per cent by a manufacturer of engine lathes and upright drills. Punch presses continue to be the only type of machine for which there is an unabated demand.

The Jackson Auto Radiator Works, 3133 Cottage Grove Avenue, Chicago, is receiving bids for remodeling its three-story plant, 50 x 100 ft.

The Edison Electric Appliance Co., 5660 West Taylor Street, Chicago, has awarded contracts for a one-story boiler house, 63 x 91 ft., to cost \$35,000.

The Clemetson Co., desk manufacturer, 2607 Flournoy Street, Chicago, has let contract for a one-story boiler house and engine room, 83 x 109 ft., 3401-51 West Division Street, to cost \$50,000.

The Payson Mfg. Co., manufacturer of hardware, 2930 West Jackson Boulevard, Chicago, has let contract for a three-story addition, 23 x 60 ft., to cost \$15,000.

The Art Lamp Mfg. Co., 521 South Wabash Avenue, Chicago, has purchased a plant on the corner of Throop and Fifteenth streets for the manufacture of lamps.

The Roos Foundry, Inc., a recently organized corporation with \$500,000 capital stock, has purchased from the Henry Roos Foundry Co. the southeast corner of Bloomingdale Road and Ballou Street, Chicago, 177 x 180 ft., improved with a machine shop and other buildings. A \$50,000 addition is planned.

The Interstate Brass Co., 11 South Des Plaines Street, Chicago, is constructing a one-story plant at 15 North Peoria Street.

J. W. Aulson & Sons, manufacturers of machinery, Waukegan, Ill., have organized under the laws of the State with \$300,000 capital stock.

The Crary Machine Works, Benton Harbor, Mich., which recently sold its plant to the Benton Harbor Malleable Foundry Co., has purchased a site fronting on West Main Street and west of the Saranac Machine Co., where it will construct a new plant, 70 x 200 ft., two stories.

Deere & Co., Moline, Ill., will erect a foundry addition, 120 x 200 ft., a general shop, 120 x 120 ft., and a cupola building, 40 x 40 ft.

The Walter H. Prier Co., Marshalltown, Iowa, has purchased sites for an aluminum foundry and a bronze bushing foundry. Plans have not yet been drawn.

The National Car Coupler Co., Attica, Ind., will reopen its plant at Murphysboro, Ill., about June 20. The foundry has been idle since Jan. 1, 1919.

The Imperial Machinery Co., Grand Rapids, Mich., has changed its style to the Imperial Metal Products Co., recently incorporated with \$100,000 capital stock.

The Grand Rapids Wire Products Co., Grand Rapids, Mich., has increased its capital stock from \$10,000 to \$20,000.

The Apex Truck Co., Grand Haven, Mich., plans the erection of a one-story addition, 60 x 130 ft., to cost \$75,000.

The National Spring Products Co., Gary, Ind., is building a one-story addition, 93 x 244 ft., to cost \$60,000.

The Mathews Banner Range Co., South Bend, Ind., has been reorganized by L. C. and Daniel J. Mathews, South Bend, and W. A. Mortenson, Cleveland, with \$200,000 capital stock.

The Modern Foundry & Machine Co., 4725 Dupont Avenue, Minneapolis, will build a foundry, 80 x 150 ft., to cost \$60,000.

The Dreis & Krump Mfg. Co., manufacturer of Chicago steel bending brakes and sheet metal-working machinery, 2909-2928 South Halsted Street, Chicago, has completed a one-story addition, 70 x 112 ft., equipped with a 10-ton crane. With this enlargement it expects to double the production of its power brakes and relieve the congestion in its shop for manufacturing hand brakes.

The Chicago Steel & Wire Co., Torrence Avenue, Chicago, is taking bids for a one-story brick addition, 70 x 110 ft. and 38 x 64 ft., to cost about \$100,000, including equipment. L. G. Hallberg & Co., 116 South Michigan Avenue, is architect.

The Commonwealth Motors Co., Chicago, a Delaware corporation, has increased its capital from \$400,000 to \$6,000,000.

The Elgin Motor Car Corporation, Archer Avenue and Sixty-first Street, Chicago, is planning for a two-story addition, 160 x 400 ft., to cost about \$250,000, including equipment.

The Getzler Storage Battery Co., Highland Park, Ill., has been incorporated in Delaware with capital stock of \$300,000 by Henry F. Tenney, Charles F. Harding, Jr., and Harry A. Parkin, Highland Park, to manufacture electric storage batteries.

The Underfeed Stoker Co. of America, Chicago, a New Jersey Corporation, has increased its capital stock from \$1,000,000 to \$1,250,000.

The E. Katzinger Co., 120 North Peoria Street, Chicago, manufacturer of baking equipment, has taken bids for a seven-story plant, 50 x 120 ft., at Washington and Sangamon streets, to cost about \$200,000.

Cincinnati

CINCINNATI, JUNE 14.

The most encouraging feature of the machinery market the past week was the number of purchases by the railroads. Practically all the equipment on the list recently issued by the Chesapeake & Ohio has been covered. It is understood that this road will soon have another good-sized list out for equipment for a new shop to be erected this fall. Other railroad buying included heavy duty engine lathes for an Eastern shop of the Baltimore & Ohio and several punches and shears for the Lehigh Valley and Texas Pacific roads. The Norfolk & Western list is still pending. The Baltimore & Ohio is understood to be completing a list of equipment required for all its shops and the Southern railroad is also preparing a list. These are expected to be out within a week or two.

Among other purchasers the past week were the Buckeye Steel Castings Co., Columbus, Ohio; the B. F. Avery & Sons Co., for its new plant in Louisville, Ky., and the General Motors Corporation for its works at Flint, Mich.

Railroad equipment companies are ordering additional machines, including axle turning lathes, carwheel lathes, punches and plate shears.

The local labor situation continues to improve. It is estimated that there are now 1000 more men employed than in the second week of May, when the strike had reached its highest point.

Practically all machine-tool manufacturers in this district advanced their prices during the month of March and April, and these schedules are expected to remain in effect through the summer months, at least.

The Superior Pattern Co., Cincinnati, has been incorporated with a capitalization of \$10,000 by H. H. Schmees, R. Frankl, A. Frankl, W. Mentrop, Sr., and John Weigand. The company will do a general pattern making business.

The Poinsette Engineering Co., Newport, Ky., has been incorporated with a capitalization of \$100,000 by Frank M. Poinsette, R. W. Nelson, W. E. Gallagher, Newport, and George F. Eckett, Cincinnati, to manufacture automobile accessories and other machinery. An office has been opened in the Nelson Building on Fourth Street.

The Oakley Machine Tool Co., Cincinnati, has increased its capitalization from \$110,000 to \$250,000. It recently purchased property in the Oakley section and plans are now being made for a new works, construction to start in the fall or early next spring. J. H. Thayer is president.

The Newport Mfg. Co., Newport, Ky., capitalized at \$75,000 has purchased the Weingartner planing mill property on Saratoga Street, Newport, for \$50,000, which will be remodeled and equipped for the manufacture of automobile bodies. W. J. Morley and C. W. Darwinkle, both of Detroit, are interested in the new company.

The Midwest Tool & Engineering Co., Hamilton, Ohio, has been incorporated with a capital stock of \$50,000 by C. Cammerer, A. W. Shulman, A. T. Engdahl, O. A. Koogler and D. M. Boude.

The Champion Foundry Co., Piqua, Ohio, has commenced the erection of a new foundry on South Main Street, of brick and steel, 80 x 112 ft., with provision for a second unit. James E. Bryan is president.

The Lochnane Motor Development Co., Dayton, Ohio, with offices in the Beaver Power Building, has been incorporated with a capital stock of \$50,000 to complete experimental work with a new eight-cylinder automobile engine. According to present plans a \$3,000,000 corporation will be formed in the near future for manufacturing and placing the engine on the market. The plant will be located in Dayton.

The Troy Match Plate Co., Troy, Ohio, has been incorporated with a capital stock of \$10,000 by W. T. Anglemeyer, Elmer Scheaf, Stanley N. Touchman and J. C. Fullerton, Jr. It has taken over the building formerly occupied by the Troy Builders Supply Co., and will engage in brass and aluminum moldings, making a specialty of match plate patterns.

The Edwards Mfg. Co., Cincinnati, has purchased property at the corner of Third Street and Eggleston Avenue, for a consideration said to be \$75,000, and also has an option on a tract which separates this property from the main works. Plans call for the erection of a four or six-story building, but nothing definite will be done for some time.

The Allied Belting Co., Greenville, Ohio, will increase its capital stock from \$60,000 to \$100,000. It manufactures conveyor and transmission belts and the plant is now located at Toledo, but it is understood that the directors are contemplating moving the foundry to Greenville, where a factory costing \$30,000 will be constructed.

The Rich Pump Co., Cincinnati, has increased its capital stock from \$50,000 to \$150,000. It is contemplating extensions, but it is not expected that work will begin before next fall or early spring.

The Averbeck Shaper Co., Covington, Ky., which some time ago was considering the removal of its plant to Dayton, Ohio, has decided to remain in its present quarters.

The Dunbar-Wood Engineering Co. of Covington, Ky., manufacturer of the Dunbar Variable Speed Pulley, is preparing plans for the erection of a foundry which it expects to have in operation within three months.

The American Can Co., 120 Broadway, New York, is completing plans for its new four-story reinforced-concrete plant at Spring Grove Avenue and Fergus Street, Cincinnati, to cost about \$1,000,000, including equipment.

The Springfield Malleable Iron Co., Springfield, Ohio, will build two two-story additions, 30 x 50 ft., on Bechel Avenue, to cost about \$55,000. Construction will be inaugurated early in July.

The Hercules Rubber Corporation, 325 West Fifth Street, Cincinnati, has completed plans for a two-story and basement works, 200 x 300 ft. W. G. Brown, 2801 Union Central Building, is the architect and engineer.

The Prest-o-Lite Co., Indianapolis, Ind., manufacturer of acetylene apparatus, will inaugurate construction early in July on a one-story plant, 25 x 100 ft., at Cincinnati, estimated to cost about \$40,000.

The Defiance Motor Truck Co., Defiance, Ohio, has broken ground for a one-story addition, 30 x 250 ft., on East Defiance Street, to cost about \$100,000.

Indianapolis

INDIANAPOLIS, June 14.

The Lomar Armored Tire Co., Inc., Lemcke Annex, Indianapolis, has arranged for the immediate erection of the initial units of its new automobile tire plant at New Castle, Ind., to cost about \$200,000. H. J. Lomar is president.

Fire, June 8, destroyed a large part of the Puritan Bed Spring Co.'s plant, 902-912 Kentucky Avenue, Indianapolis. The loss is estimated at \$40,000. George D. Thornton is president and Arthur R. Baxter, secretary.

The McGill Metal Co., Valparaiso, Ind., has begun the erection of two buildings, one for a foundry and the other for a machine shop.

The Franklin Mfg. Co., Franklin, Ind., has increased its capital stock from \$25,000 to \$125,000.

Fire, June 3, destroyed the foundry of the Edwards Valve Co., East Chicago, Ind., with loss estimated at \$35,000.

The Zenite Metal Co., Indianapolis, has increased its capital stock from \$50,000 to \$1,000,000.

The Three-In-One Spark Plug Mfg. Co., Rushville, Ind., has been incorporated with \$10,000 capital stock to manufacture spark plugs. The directors are Morton Conner, George M. Guido and Harry B. Meyers.

The Bedford Tractor Co., Bedford, Ind., has been incorporated with \$10,000 capital stock to manufacture agricultural implements. The directors are Newton M. Anderson, J. Frank Walls and John R. Pearson.

The John I. Heke Tractor Co., South Bend, Ind., has been sold for \$100,000 to an organization which includes the Moline Plow Co., Moline, Ill., and the Indiana Silo Co., Anderson, Ind.

The Central South

ST. LOUIS, June 14.

The Majestic Mfg. Co., Morgan Street, St. Louis, manufacturer of stoves, heating equipment, etc., is taking bids for remodeling a building at Twenty-second and Morgan streets, as an addition to its plant. The work is estimated to cost about \$30,000.

The Standard Stamping Co., Broadway and Chambers

Street, St. Louis, manufacturer of cans, stamped metal products, etc., has awarded contract to the L. H. Grove Construction Co., Renoist Building, for a five-story plant, 53 x 60 ft., at Second and Madison streets, to cost about \$75,000.

The Automatic Light Switch Co., Louisville, has been incorporated with a capital stock of \$50,000 by J. W. Roberts, W. L. Scott and C. I. Pickrell, to manufacture railroad switches and other equipment.

The Standard Auto Garage Co., Sixth and York streets, Newport, Ky., is completing plans for a one-story service and repair works, 85 x 185 ft., at 1028-32 Monmouth Avenue, to cost about \$60,000.

The St. Joseph Heat, Light & Railway Co., St. Joseph, Mo., is planning for enlargements in its electric power plant, including the installation of new equipment.

The Kentucky Refractories Corporation, Russell, Ky., recently incorporated with a capital stock of \$750,000, has plans under way for three manufacturing units for the production of high-grade refractories with a daily capacity of about 50,000 firebrick per unit. The company has taken over about 2500 acres of clay properties in this section. Clyde K. Turley is manager.

The Continental Supply Co., Post Dispatch Building, St. Louis, manufacturer of gas and oil well supplies, has increased its capital stock to \$5,000,000. It is a subsidiary of the Youngstown Sheet & Tube Co., Youngstown.

The Cyril Iron Works, Cyril, Okla., has been organized to manufacture iron and steel products. L. A. Davis and A. A. Stine head the company.

The Memphis Iron & Steel Co., Memphis, Tenn., recently organized to manufacture bar and flat steel, railroad supplies, etc., is having plans prepared for its new plant on a local site, estimated to cost about \$300,000 with equipment. Later, an extension will be constructed for the production of structural steel shapes. John E. Conley, B. L. Mallory and E. H. Baumgartner head the company.

The Mutual Enamel Ware Co., Chattanooga, Tenn., has been organized by officials of the Cahill Iron Works, to manufacture heavy enamel ware products. An addition will be erected to the present Cahill plant, for occupancy by the new organization, estimated to cost about \$250,000, including equipment. F. H. Caldwell is president.

The city of Conway, Ark., is in the market for an engine and an electric generator for the municipal power plant.

The Wheaton Milling & Power Co., Wheaton, Mo., H. G. Goosetree, manager, is in the market for electric motors and other equipment.

The Wood-Evarts Stove Co., Springfield, Mo., will erect a \$200,000 addition, doubling the capacity of the plant.

The Brecht Co., St. Louis, will erect a two-story building, 107 x 131 ft., to be used as a machine shop.

The Kentucky Steel Products Co., Lexington, Ky., has been incorporated with a capital stock of \$250,000, to manufacture special wire, nails, bolts and other steel products. The incorporators are John R. Humphrey, James C. Stone, John L. Buckley and B. F. Buckley, Lexington, and R. D. Jenkins of Chicago. A plant will be erected which is expected to be in operation the middle of October.

The Illinois Malleable Iron Co., Chicago, which recently purchased a 42-acre tract on Ash Bottom Road, Louisville, Ky., will shortly begin the erection of a foundry, 147 x 263 ft., and an annealing building, 113 x 185 ft. Plans and specifications for the buildings are now posted at the Industrial Foundation, Louisville.

The American Motor Cycle Co., Louisville, Ky., has purchased half the property of the Kentucky Laundry Co. on Underhill Street and will convert it into a motor cycle manufacturing plant. It was recently incorporated with a capitalization of \$200,000 by Edward D. Hatcher, Otto Seelbach and J. C. Murphy, and is now purchasing machinery.

The Reciprocating Electric Tool Co., Louisville, has increased its capitalization from \$100,000 to \$1,000,000. No information has been given out as to whether or not extensions will be made.

California

LOS ANGELES, June 8.

The State Land Settlement Board, Turlock, Cal., has completed plans for the erection of a new one-story pipe shop, 135 x 300 ft., to cost about \$14,000. Max E. Cook, Delhi Colony, Turlock, is engineer.

The Moore Autoplane Co., Los Angeles, Cal., has been incorporated with a capital stock of \$50,000 by Virgil Moore,

H. C. Freeman and A. B. Rice, 1033 East Fifty-seventh Street, to manufacture airplanes, parts, etc.

The Mutual Tractor Unit, San Dimas, Cal., has been organized to manufacture motor truck parts, etc. H. S. Gilman and W. H. Johnson, San Dimas, head the company.

The San Pedro, Los Angeles & Salt Lake Railroad, South Main Street, Los Angeles, has awarded contract to Leonard & Peck, H. W. Hellman Building, for a one-story brick and reinforced-concrete tank car repair and construction shop on Seventh Street, to cost about \$100,000, including equipment.

Considerable mechanical and electrical machinery will be installed in the addition to be erected at the plant of the National Paper Products Co., Church Street, Stockton, Cal., estimated to cost \$1,000,000. It will be two stories, brick and concrete, 180 x 665 ft. It is planned to build a first unit at once with others at a later date. The company's architectural department has prepared plans.

Allen & Son, San Bernardino, Cal., manufacturers of iron and steel products, have completed plans for a forge shop addition, 50 x 60 ft.

A. O'Neill, 68 Post Street, San Francisco, has filed plans for a one-story reinforced-concrete building on Fourth Street, to be equipped as a brass works.

The Hopper Welding Works, 1046 South Olive Street, Los Angeles, has been organized to manufacture welding apparatus. Charles Hopper heads the company.

The Allen-Burbank Motor Co., Marsh-Strong Building, Los Angeles, is taking bids for a new two-story automobile plant, 40 x 135 ft., at Burbank, with two one-story wings, each 40 x 160 ft.

The new plant of the Oil Mining Equipment Co., 2026 Santa Fe Avenue, Los Angeles, will consist of a main building 80 x 550 ft., brick, with wing, 60 x 150 ft.; a one-story shop, 20 x 200 ft.; boiler plant, 16 x 16 ft., and tank department, 20 x 20 ft. Gordon La Barr, 500 Stimson Building, is the architect.

The Fire Department, Long Beach, Cal., is having plans prepared for a one-story machine shop, 50 x 100 ft., to be built in connection with two new fire stations. Natt Piper, 12 Locust Avenue, is the architect.

The National Radio Co., 156 Second Street, San Francisco, manufacturer of radio apparatus, has filed plans for a one-story factory on Twentieth Street, near Shotwell Street.

The Fordartic Refrigeration Co., Los Angeles, has been incorporated with a capital stock of \$150,000 by E. T. and R. G. Ford and F. J. Compton, to manufacture refrigerating equipment.

The Crown City Radiator Works, 43-45 East Union Street, Pasadena, Cal., has filed notice of organization to manufacture automobile radiators and other sheet-metal specialties. Joseph Auch heads the company.

The Sprague Meter Co., Los Angeles, has been incorporated with a capital stock of \$10,000 by E. W. Langdon and Fred Mansur, 1100 Investment Building, to manufacture gas meters and similar products.

The Gulf States

BIRMINGHAM, June 14.

The Alabama Power Co., Birmingham, Ala., is considering plans for additions to its hydroelectric power plants and system. It is proposed to build a new works on the Tallapoosa River with initial capacity of about 90,000 hp. Thomas W. Martin is president.

The Rex Motor Car Mfg. Co., New Orleans, La., a Delaware corporation, has increased its capital from \$250,000 to \$1,000,000.

The Wagner Supply Co., operating plants at Ranger and Breckenridge, Tex., for the manufacture of oil-well equipment, is planning for the erection of new works in the vicinity of Fort Worth, where a 25-acre site has been secured. To provide for expansion, the company has filed article of incorporation, with a capital stock of \$1,000,000. Warren Wagner, R. W. Davis and W. W. Kent head the company.

Fire, May 29, destroyed the shop of the Stanley Truck & Body Co., Fort Worth, Tex., manufacturer of automobile bodies, etc.

The National Forge Co., Anniston, Ala., recently incorporated with a capital stock of \$50,000, has awarded contract to the Ogletree Construction Co., Anniston, for its new plant, to be equipped for the manufacture of forgings for railroad service. B. F. Lively is president and Thomas C. King secretary and treasurer.

Dallas Gross and H. A. Reid, Lake Charles, La., are

organizing a company to build a plant for the manufacture of steel tanks, for oil and gasoline storage, and have acquired a local site totaling about 6000 sq. ft. Initial operations will be devoted to the manufacture of tanks averaging 50,000 gal.

The Galena-Signal Oil Co., Houston, Tex., has increased its capital stock from \$6,000,000 to \$7,500,000 for expansion.

The Kwickturn Tractor Co., Jacksonville, Fla., has been incorporated with a capital stock of \$50,000 by B. J. Walker and William E. Gullett, to manufacture farm tractors, parts, etc.

The Corsicana Grader & Machine Co., Corsicana, Tex., has been incorporated with a capital stock of \$100,000 by C. E. Kerr, A. Ferguson and S. L. Reese, to manufacture graders and other agricultural machinery.

The City Council, Houston, Tex., is considering plans for a new power plant to cost about \$60,000.

The Breckenridge Oil & Refining Co., Breckenridge, Tex., recently incorporated with a capital stock of \$300,000, is planning for the erection of a new refinery with a daily capacity of about 1000 bbl. J. E. Granberry is president.

The Ornamental Foundry Co., Anniston, Ala., is planning to rebuild its machine works and pattern shop, recently destroyed by fire, with loss estimated at \$25,000.

Plans of the Oldsmar Tractor Co., Oldsmar, Fla., recently incorporated, provide for additional buildings, including a foundry to cost \$20,000.

The Anniston Body Co., Anniston, Ala., has been incorporate with \$100,000 capital stock, to manufacture automobile bodies and tops. E. G. Bosworth is one of the incorporators.

Plans for a factory and the installation of equipment are being made by the Seventh Street Repair & Welding Co., Miami, Fla.

The Wharton Motors Co., Inc., 914 Main Street, Dallas, Tex., has purchased a site at Mockingbird Lane and Airline Road and will build a plant to manufacture automotive supplies, automobiles, trucks and tractors.

The Pacific Northwest

SEATTLE, June 8.

The car shortage is having a serious effect on the lumber industry in this section and many mills have been compelled to curtail production. Extreme difficulty in securing material from Eastern points is still felt, with no immediate prospect for relief.

Plans are under way for rebuilding the factory of the North Portland Box Co., Portland, recently destroyed by fire with a loss of \$300,000.

The American Can Co., New York, will erect a factory in Portland, Ore., to cost \$1,500,000. It will be three stories, 388 x 445 ft., of concrete construction.

The Oregon, Washington & Idaho Aeroplane Co., Portland, is erecting a hangar and repair shop, 60 x 75 ft., at Guilds Lake, near Portland, to cost about \$10,000.

Contracts for the construction of new buildings for the Griffin Wheel Co., South Tacoma, were let the latter part of May. The main structure will be 52 x 326 ft.; the core room, 25 x 75 ft., and charging room 46 x 50 ft.

The Northwestern Brass Foundry, Portland, has been organized by W. C. Thom, Robert J. Gray and others, and will establish a foundry and repair plant. Steamfitting supplies and metal goods will be manufactured.

The Rucker Brothers Sawmill, Lake Stevens, Wash., was completely destroyed by fire recently with a loss of \$150,000. It is reported the plant will be rebuilt.

H. F. Davidson, Lebanon, Ore., will construct a sawmill near that city, with a daily capacity of 20,000 ft.

Canada

TORONTO, June 14

The Dominion Steel Products, Ltd., Brantford, Ont., is building a new pattern shop of brick and steel, to take care of the increased demand brought about by the recently completed grey iron and brass foundry. The foundry is equipped with a 20-ton air furnace, two cupolas with a capacity of 12 tons per hr., and an electric brass furnace of 1000 lb. capacity. The company is engaged in the manufacture of rolling mill equipment, heavy rubber working machinery and all classes of drive, line and propelling shafting. It has also recently developed a 120-hp. heavy oil engine of the Diesel type, which may be used independently or direct connected with a generator.

The Brantford Emery Wheel Co., Ltd., Brantford, Ont., has recently been acquired by interests identical with those of the Waltham Grinding Wheel Co., Waltham, Mass. It is the intention of the new owners to facilitate production and to install new machinery and equipment in the local plant. Frank A. Howard will continue as managing director.

At the annual meeting of the St. John Drydock & Shipbuilding Co., St. John, N. B., James Playfair, Midland, Ont., was elected president; D. S. Pratt, Midland, vice-president and managing director; Thomas A. Duff, Toronto, secretary. The directors are D. L. White, Jr., Midland; W. P. Phin, Hamilton, Ont.; W. J. Sheppard, Waubaushene, Ont., and James B. Craven, New York.

The Langslow-Fowler Furniture Co., Rochester, N. Y., has started work on the erection of a factory at Cobourg, Ont., to cost, including machinery, \$200,000. Among those interested are S. C. Langslow and Martin Thorne, of Rochester.

T. J. Moore, Wiarton, Ont., is in the market for a 75 to 100-hp. engine, suitable for sawmill.

The P. L. Robertson Mfg. Co., Ltd., Milton, Ont., reports an increasing demand for its products and proposes to install new screw making machinery to greatly increase its output.

The Shinn Mfg. Co., Guelph, Ont., will start work as soon as contracts can be let on the erection of an addition, 30 x 70 ft., three stories. When completed a portion will be occupied by the National Standard Co., a co-operative concern, which manufactures the cord for the edges of automobile tires. W. H. Day is manager of the Shinn company.

The Bird-Archer Co., Cobourg, Ont., has recently moved into larger quarters and now proposes to go into the manufacture of boiler and railroad valves, high-speed cast drills, etc.

The A. C. Spark Plug Co., Brantford, Ont., has awarded the general contract for a factory to cost \$35,000 to Schultz Brothers, 35 Albion Street.

The Canada Hydro Stone, Ltd., Lake View Avenue, Montreal, has let the general contract to A. F. Byers & Co., 340 University Avenue, for the erection of a plant to cost \$25,000.

The Record Foundry & Machine Co., Moncton, N. B., will rebuild its machine shops recently destroyed by fire. New equipment will be purchased.

The sawmill owned by Jose Cote, St. Joachim, Que., was destroyed by fire with a loss of \$200,000. It is understood that the plant will be rebuilt immediately.

The Wells Brothers Co. of Canada, Ltd., Galt, Ont., is about to change its name to the Greenfield Tap & Die Corporation of Canada, Ltd., and is also increasing its capital stock from \$40,000 to \$250,000. The company will shortly increase its manufacturing facilities to more than double the present capacity. Considerable new machinery and equipment will be required.

The Collingwood Shipbuilding Corporation, Ltd., Montreal, has been incorporated with a capital stock of \$100,000, by Frederick H. Markey, Waldo W. Skinner, George G. Hyde and others as provisional directors, to build ships, engines, motors, etc.

The Kemp Metal Auto Wheel Co., Ltd., Toronto, has been incorporated with a capital stock of \$100,000, by Edward Kemp, Charles H. Ruggles, Robert R. Armstrong and others to manufacture automobile and metal wheels, machinery, parts, etc.

The British Empire Shipbuilding Corporation, Ltd., Montreal, has been incorporated with a capital stock of \$100,000 by Frederick H. Markey, Waldo W. Skinner, George G. Hyde and others as provisional directors, to build ships, boats, drydocks, etc.

The C. P. H. Gas Engine Co. of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$100,000 by Joseph Cepeda, Jean Van der Ghote, Louis Chalvin and others to manufacture engines, motors, machinery, etc.

The Hugh Park Foundry Co., Ltd., Oshawa, Ont., has been incorporated with a capital stock of \$200,000 by Frank A. Park, Oshawa; James Parker, 157 Bay Street; Maurice Crabtree and others of Toronto, to manufacture castings, forgings, tools, etc.

The Williams Tool Corporation of Canada, Ltd., Brantford, Ont., has been incorporated with a capital stock of \$150,000 by James Harley, Edmund Sweet, Archibald M. Harley and others, to acquire and take over the plant and business now carried on by John H. Hall & Sons, Ltd., manufacturer of tools, machinery, etc. It is the intention of the new owners to increase production and to install considerable new machinery and equipment.

The Motor Accessories & Supplies, Ltd., Kitchener, Ont., has been incorporated with a capital stock of \$40,000 by Henry Sweitzer, Armand A. Schreiter, Arthur L. Sauder and others to manufacture automobile supplies, electric machines, fixtures, etc.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel" Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Refined iron, base price	5.25c.
Swedish bars, base price	20.00c.

Soft Steel:

3/4 to 1 1/2 in., round and square	3.52c. to 5.25c.
1 to 6 in. x 3/8 to 1 in.	3.52c. to 5.25c.
1 to 6 in. x 1/4 to 5/16	3.62c. to 5.25c.
Rods—3/8 and 11/16	3.57c. to 5.05c.
Bands—1 1/2 to 6 by 3/16 to No. 8	4.22c. to 6.50c.
Hoops	5.57c. to 6.50c.

Shapes:

Beams and channels—3 to 15 in.	3.47c. to 5.25c.
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Angles:

3 in. x 1 1/4 in. and larger	3.47c. to 5.25c.
3 in. x 3/16 in. and 1/8 in.	3.72c. to 5.60c.
1 1/2 to 2 1/2 in. x 1/8 in.	3.52c. to 5.90c.
1 1/2 to 2 3/4 in. x 3/16 in. and thicker	3.47c. to 5.85c.
1 to 1 1/4 in. x 3/16 in.	3.52c. to 5.90c.
1 to 1 1/4 x 1/8 in.	3.57c. to 5.95c.
7/8 x 7/8 x 1/8 in.	3.62c. to 6.00c.
3/4 x 1/8 in.	3.67c. to 6.05c.
5/8 x 1/8 in.	4.07c. to 6.85c.
1/2 x 3/32 in.	5.17c. to 7.55c.

Tees:

1 x 1 1/8 in.	3.87c. to 6.25c.
1 1/4 in. x 1 1/4 x 3/16 in.	3.77c. to 6.15c.
1 1/2 to 2 1/2 x 3/16 in. and thicker	3.57c. to 5.95c.
3 in. and larger	3.52c. to 5.30c.

Merchant Steel

	Per Lb.
Tire, 1 1/2 x 1/2 in. and larger	5.00c. to 5.25c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger)	5.50c.
Toe calk 1/2 x 3/8 in. and larger	6.00c.
Cold-rolled strip (soft and quarter hard)	12c. to 14c.
Open-hearth spring steel	7.00c. to 10.00c.
Shafting and Screw Stock:	
Rounds	6.25c. to 7.00c.
Squares, flats and hex.	6.75c. to 7.50c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c. to 24.00c.
Extra best cast steel	25.00c. to 30.00c.

Tank Plates—Steel

	Per Lb.
1/4 in. and heavier	3.67c. to 5.50c.

Sheets

	Per Lb.
Blue Annealed	
No. 10	7.12c. to 8.00c.
No. 12	7.15c. to 8.05c.
No. 14	7.22c. to 8.10c.
No. 16	7.32c. to 8.20c.

Box Annealed—Black

	Soft Steel C.R., One Pass per lb.	Wood's per lb.
Nos. 18 to 20	8.30c. to 9.90c.	
Nos. 22 and 24	8.35c. to 9.85c.	10.80c.
No. 26	8.40c. to 9.90c.	10.85c.
No. 28	8.50c. to 10.00c.	11.00c.
No. 30	8.60c. to 10.10c.	
No. 28, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	8.75c. to 10.50c.
No. 16	9.00c. to 10.75c.
Nos. 18 and 20	9.15c. to 10.90c.
Nos. 22 and 24	9.30c. to 11.05c.
No. 26	9.45c. to 11.20c.
No. 27	9.60c. to 11.35c.
No. 28	9.75c. to 11.50c.
No. 30	10.25c. to 12.00c.
No. 28, 36 in. wide, 20c. higher.	

Pipe

	Blk. Galv.	Blk. Galv.
1/2 in. Butt.	—36 —19	3/4-1 1/2 in. Butt. —5 +15
3/4-3 in. Butt.	—40 —24	2 in. Lap.... +1 +19
3 1/2-6 in. Lap.	—35 —20	2 1/2-6 in. Lap. —1 +15
7-12 in. Lap.	—25 —8	7-12 in. Lap. +10 +28

Standard—Steel

Wrought Iron

Steel Wire	
BASE PRICE*	ON NO. 9 GAGE AND COARSER
Per lb.	
Bright basic	8.00c.
Annealed soft	8.00c.
Galvanized annealed	8.50c.
Coppered basic	8.50c.
Tinned soft Bessemer	10.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

	BASE PRICE
High Brass Sheet	28 1/4c. to 29 1/2c.
High Brass Wire	28 1/4c. to 29 1/2c.
Brass Rod	26 1/4c. to 29 c.
Brass Tube	42 1/2c. to 44 1/2c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 29 1/2c. per lb. base. Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

	Coke—14x20
Primes	Wasters
Grade "AAA"	80 lb... 11.80 11.55
Charcoal	90 lb... 11.90 11.65
14x20	100 lb... 12.00 11.75
IC	\$16.50 \$14.25
IX	18.75 16.25
IXX	20.50 18.00
IXXX	22.25 19.75
IXXXX	23.75 21.50
IXXX	16.25 16.00

Terne Plates

	8 lb. Coating 14x20
100 lb.	\$9.35
IC	9.50
IX	10.50
Fire door stock	12.75

Tin

	53c.
Bar	.58c. to 60c.

Copper

	20c.
Lake ingot	19 1/2c.
Electrolytic	19 1/2c.
Casting	19 1/4c.

Spelter and Sheet Zinc

	10c. to 11c.
Western spelter	10c. to 11c.
Sheet zinc, No. 9 base, casks	14 1/2c. open 15c.

Lead and Solder*

	10c. to 11c.
American pig lead	10c. to 11c.
Bar lead	11c. to 12c.
Solder 1/4 and 1/2 guaranteed	38c.
No. 1 solder	35c.
Refined solder	31c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

	90c.
Best grade, per lb.	.50c.

Antimony

	11 1/4c. to 11 3/4c.
Asiatic	11 1/4c. to 11 3/4c.

Aluminum

	No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.
	.35c. to .38c.

Old Metals

Slightly lower prices have been the rule this week, with few transactions to report. Dealers' buying prices are as follows:

	Cents per lb.

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